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PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

Greater use of mobile platforms and increased research on underwater completions are among the major trends that indicate a big decade ahead offshore 40

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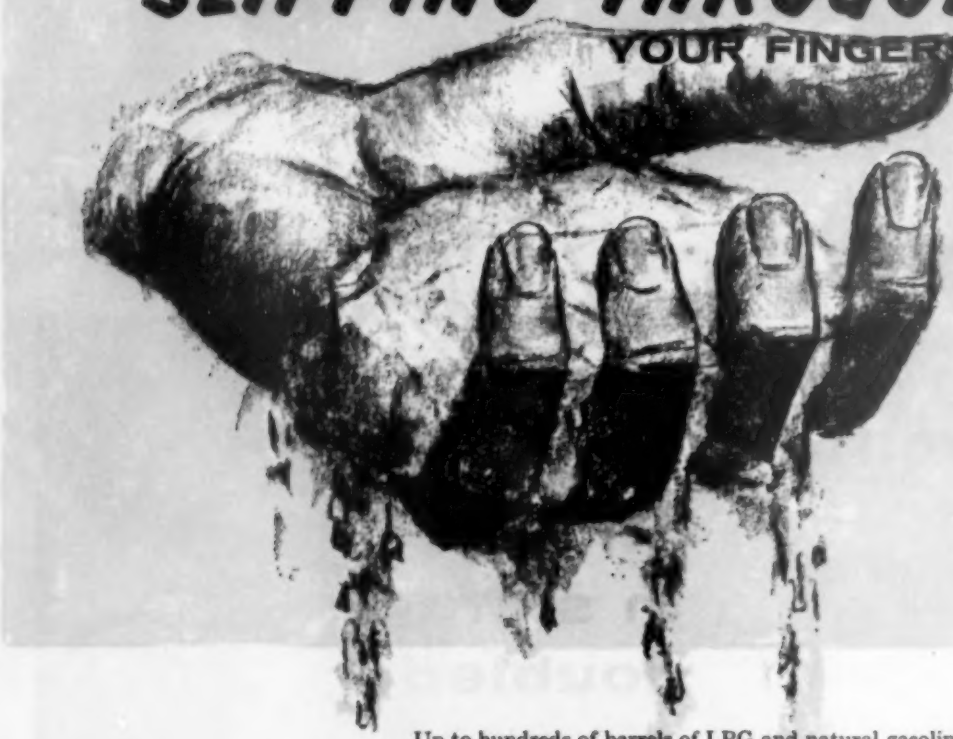

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INSIDE *Slant*

PROFIT ON FLIMSY PAPER

Are the profits of oil companies as large as indicated in their financial statements?

On the surface, it appears that the industry as a whole did quite well in 1959 in comparison with 1958.

But these financial statements fail to reflect one pertinent fact. The companies are selling oil that was discovered years ago at prices much cheaper than those of today.

If the companies should charge the replacement costs of the crude being sold today against current earnings, a large portion of the reported profits undoubtedly would disappear.

No longer is it true that the higher costs of finding and producing a barrel of oil will be reflected in the price of crude. As a matter of fact, prices are deteriorating while costs are still on the rise.

And as long as the worldwide surplus crude producing capacity exists, there's nothing in the picture to indicate the situation will change.

The modest growth in domestic demand and the larger increases in world needs are helpful. But at the same time, more oil also is being discovered.

LeRoy Menzing
EDITOR

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DEPT/Opinions

Views That Make News . . .

"In the postwar period, the U.S. oil industry has built 360,000 mi. of oil and gas pipelines—an addition that exceeds the total existing mileage of U.S. railroads. In the same period, it has drilled 624,000 wells to a depth of 3.5-billion ft., or the equivalent of more than 80 times through the world."

—ROBERT L. MILLIGAN
President
Pure Oil Co.

. . . and Letters

Dear Sir:

I want to register my real disappointment with the way my statement on TBA was handled [PW—Jan.29 '60,p9]. Cut as it was, it makes absolutely no sense. No one could read it and know why in the world I would make a statement of this kind.

What we were trying to prove was why the companies in the gasoline business must maintain an integrated TBA program.

DWIGHT T. COLLEY
Vice-president
The Atlantic Refining Co.

(Editor's note: The Colley statement made these points:

"We have found that to secure quality dealers and give them a good chance of success, we must not only provide a carefully designed service station and quality gasoline, but we must also make available a well advertised and complete line of TBA merchandise that guarantees satisfaction to the motorist and gives the dealer a reasonable profit opportunity. . . .

"Our program has always recognized the dealers' right to buy . . . where he chooses, and each Atlantic dealer is guaranteed this in writing. . . .

"Experience has proved, however, that many dealers cannot afford and do not choose to spend the time, energy, and expense it takes to develop a sound TBA program of their own and prefer [our] program.

"Legislation which would prevent our company from offering this program to our dealers just does not make any sense.")

Dear Sir:

We are fuel oil jobbers in St. Louis and are being hard-pressed by the gas company in maintaining our market. In your "Gas May Lead Canada to Big Year" [PW—Jan.15'60,p19], you mention that the additional gas exports would mean $30-million a year increase.

Tell me and tell me well: How are you going to help the crude picture when you put gas in oil markets? If you increase gas sales $30-million, won't you decrease oil sales $150-million?

Of course the oil companies have economists that they are paying millions of dollars a year and I just went to kindergarten. They ought to know.

Seems funny, we are spending money through the OHI group to try to save our markets, and it's gas from the major and minor oil companies that we are trying to protect ourselves against. As I said before, I just went to kindergarten.

RUDOLPH F. BRETSNYDER
Porter Oil Refining Co.
St. Louis, Mo.

Dear Sir:

Well Site Air Services, Ltd., is located in Calgary, not Edmonton [PW—Jan.29'60,p21].

A. G. G. DE CHASTELAIN
Secretary
Well Site Air Services, Ltd.

Dear Sir:

On Page 36 of the Jan. 29 issue, there appeared a listing of oil companies with their 1959 Venezuelan crude oil production with comparative figures to show the change over 1958 and 1957.

In seeing the figure of 25,900 b/d for Atlantic, it was obvious that our share of the production from concessions operated by others in which we have an interest was not included.

We have had a healthy increase in our Venezuelan production during the last several years as the result of joint ventures. This is opposite to the impression you gave, that Atlantic's production decreased in 1959 vs. 1958.

To correct the records, Atlantic's net production, plus royalties applicable to that production in Venezuela in 1959, amounted to 47,100 b/d, compared to 33,600 b/d in 1958.

T. C. VEALE
Public relations dept.
The Atlantic Refining Co.

PETROLEUM WEEK *will publish reader comments each week. Address letters to LeRoy Menzing, Editor,* PETROLEUM WEEK, *330 W. 42nd St., New York 36, N. Y.*

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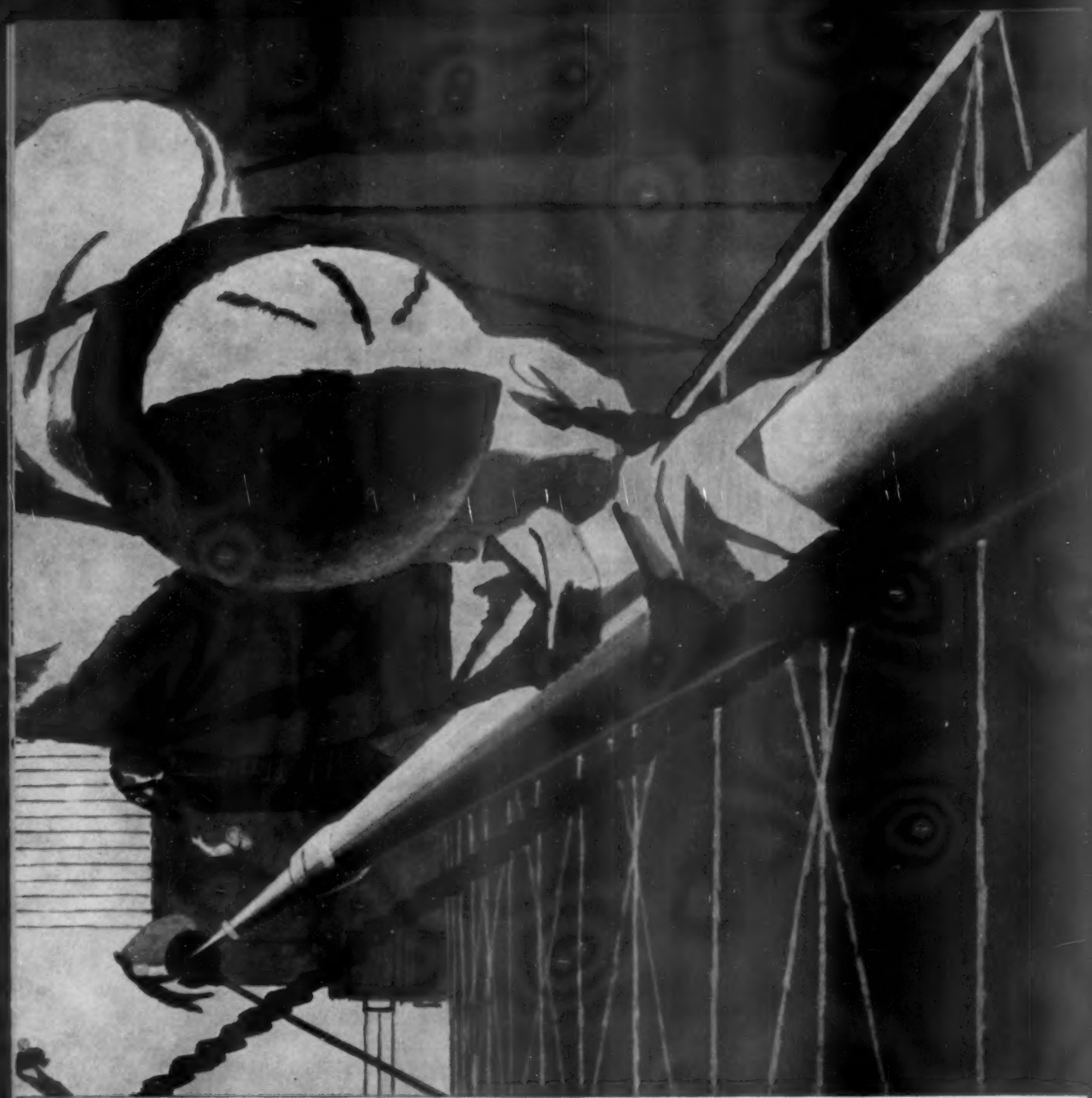

of steel. And only steel of the very best forging properties and of the highest uniformity can be used, since the modern piercing operation tends to seek out any defects in the metal.

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Good Wells Make Good News

Engineered Fracturing Treatments That Increased Operators' Profits

February 19, 1960

The "Frac Guide"* has helped make fracturing more useful than ever before. Here are recent treatments that increased net profits to producers.

- **Wayne County, Illinois** (New Oil Well) A well was completed into the Aux Vases through perforations from 3220 to 3230 feet. Usual practice has been to fracture these wells with one pound 20/40-mesh sand per gallon of fluid. Dowell engineered this treatment with the "Frac Guide": 12,000 gallons gelled crude carrying 20,000 pounds 20/40-mesh sand plus 3000 pounds 10/20-mesh sand. Injection rate was to be 30 bpm and estimated fracture area was 26,000 square feet. Treatment was performed according to recommendations. Before fracturing, well made only a show of oil. After return of load oil, it tested 10 boph.

- **Barber County, Kansas** (Old Oil Well) Completion was open hole into the Mississippi Chat. After the well was deepened to 4612 feet, but before fracturing, the 83-foot open hole section produced 4 to 7 bopd. A fracturing treatment followed recommendations prepared with the "Frac Guide". Treatment was down annulus between 2" tubing and 5½" casing. Frac fluid was 40,000 gallons of water with fluid loss, silicate control and surface tension-reducing agents. 40,000 pounds of sand was used. Injection rate averaged about 35 bpm at 2100 psi maximum pressure. A 200-pound salt plug was used midway in the treatment. The well cleaned up without swabbing and leveled off at 40 bopd flowing.

- **Marion County, East Texas** (Old Oil Well) In 23 months, production had declined from 40 to 13 bopd. Original completion was through perforations into the Henderson formation from 5911 to 5921 feet. Dowell recommended Petrojel*. Well was fractured down tubing at 4.7 bpm and 5400 psi maximum. 12,000 gallons of gelled crude carried 6000 pounds sand. Sand was shut off for two minutes out of every six to reduce danger of blocking perforations. After treatment, production leveled off at 66 bopd — a net increase of 53 bopd.

- **Jefferson County, Oklahoma** (Old Oil Well) Pay zone is the Des Moines sand, and perforations are from 1137 to 1147, 1152 to 1170, and 1364 to 1382 feet. Production had declined to 8 bopd. Well was given a treatment engineered with the "Frac Guide": 15,000 gallons lease oil with F.L.A.* (Fluid Loss Additive) and 30,000 pounds 20/40-mesh sand. 90 ball sealers were used during injection down casing at 26 bpm and 600 psi. After clean-up, well tested 250 bopd — about double the increase normally achieved in this field.

If you want the best possible return per dollar invested in well stimulation, ask Dowell to engineer your frac treatments with the "Frac Guide". For service or detailed information, contact the Dowell office or station nearest you. There are more than 150 locations in the United States, Canada, Venezuela and Argentina. Dowell, Tulsa 1, Oklahoma.

*Dowell Trademark

Services for the oil industry DOWELL

DIVISION OF THE DOW CHEMICAL COMPANY

60-Second Summary / WHAT'S HAPPENING IN OIL

February 19, 1960

dept/INDEX

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Indications point to a decade of steady growth and big operating changes for offshore oil. Next week's federal lease sale will provide a good measure of how much activity will expand in the immediate future. . . . p. 40

•

There's not much likelihood that a civil suit will follow in the wake of the Tulsa "conspiracy" trial. Justice Dept. attorneys indicate they've reached the end of the line. . . . p. 17

•

An intensified run of interunion disputes may hit the oil and chemical industries. The AFL-CIO's family arbitration plan has blown up, opening the door to increased jurisdictional strife. . . . p. 16

•

Gas utilities are planning to capture 14-million additional heating customers by 1969. If the firms are successful, the "leftovers" for oil heat would be only 2.2-million new customers. . . . p. 15

•

Processing the incremental barrel reduces unit costs, and it also cuts into profits. For despite demand gains, product stocks are high and prices are weak. . . . p. 20

•

The biggest lease sale in North Dakota's history is coming up next week. Close to 400,000 acres will be offered, including 55,000 acres in important McKenzie County, scene of a new oil discovery. . . . p. 25

•

A reinforced plastic canopy is being tested as an eye-catching lure for service station customers. It is said to be capable of resisting 80-mph. winds. . . . p. 93

•

Petroleum-derived plastics are being substituted for metals and woods to help manufacturers overcome corrosion and decay problems. New plastics makes this possible. . . . p. 66

•

Wildcat drilling in the East Texas area is picking up. Setting the pace is the current drive on the deep-seated Jurassic formation, with nine wildcats under way or planned. . . . p. 29

•

The battle for Japan's $300-million-a-year oil market is getting rougher, now that a Japanese firm has found oil in the Persian Gulf. . . . p. 84

•

Tariffs, not quotas, were cited this week as the "fairest" way to control imports. The comment came at the annual meeting of the American Institute of Mining, Metallurgical & Petroleum Engineers. . . . p. 30

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE PETROLEUM WEEK

February 19, 1960

The Gulf Coast low cargo price of No. 2 heating oil dropped to 8¢ a gal. this week, matching the February low of eight years ago. This week's decline of 3/8¢ was the second for the month. Prices were trimmed 1/4¢ on Feb. 2. The price break this week hit a broader range of the distillates, with kerosine declining 1/2¢ to 9¢ a gal. Kerosine has been one of the few "firm" products on the Gulf until now, due to the influence of jet fuel demand.

There are indications that distillate prices could move even lower before the winter is over. Price cuts in the East are reported to be driving netbacks on movements from the Gulf to below the new cargo quotations.

•

"Reasonable" controls may be placed on product imports from Puerto Rico, according to Imports Administrator Matthew V. Carson, Jr. In exchange, he indicated that controls on imports into Puerto Rico may be removed. Refiners on the island, backed by the local administration, have urged the latter action.

•

Another proposed natural gas sale went by the boards this week on the grounds that it would trigger favored-nation clauses. The Federal Power Commission cited the clauses in denying a proposed sale at 16¢ per Mcf. by three producers from the Fusselman formation in the Brown-Bassett field, Terrell County, Tex., to El Paso Natural Gas Co. At the same time, FPC permitted the producers to sell gas at 16¢ from the Ellenburger formation in the same field to El Paso. The producers are Western Natural Gas Co., Continental Oil Co., and Mobil Oil Co.

•

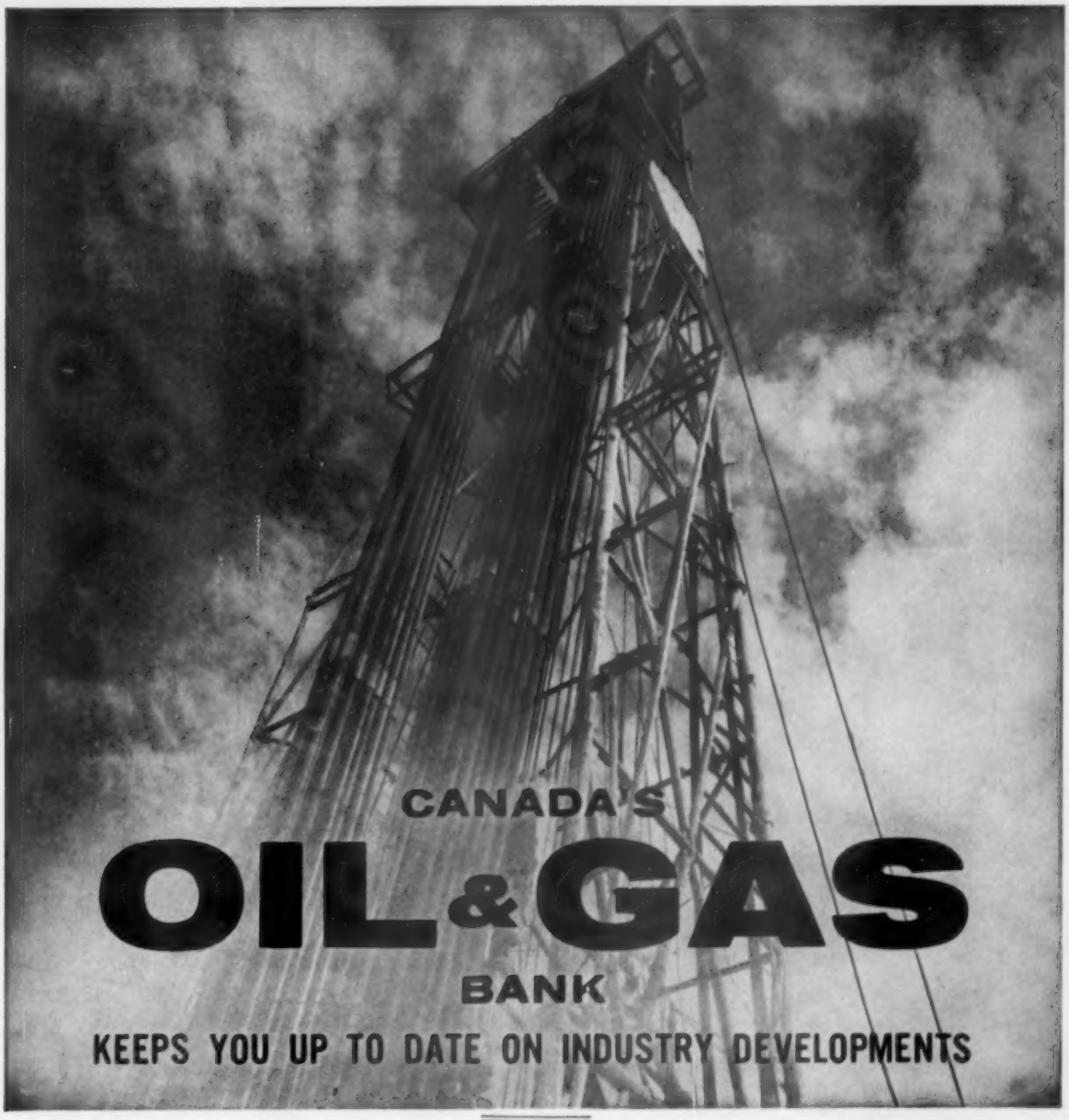
The National Petroleum Council has formed a crude reserves study committee. It will be headed by L. F. McCollum, president of Continental Oil Co., and its objective will be to update the old Petroleum Administration for War study that spanned the 1900-1944 period. Morgan J. Davis, president of Humble Oil & Refining Co., will serve as vice-chairman.

•

A leading Japanese marketer is negotiating a crude-gasoline barter deal with American Independent Oil Co. Idemitsu Kosan Co., which has a long-term crude supply contract with Gulf Oil Corp. (page 84), is discussing the swap of 1,000 b/d of gasoline for Aminoil crude, on a barrel-for-barrel basis. So far the discussions have not included the distillate and residual fuel from the crude, which presumably would be processed by a Japanese refiner.

•

The Texas Railroad Commission will take a look at the possibility of prorating pressure maintenance and waterflood production. It set a hearing for Apr. 19, one day in advance of the monthly statewide proration hearing. The commission will hear the pros and cons on controlling such production. Any action taken will not apply to existing projects.



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The Special Bulletins issued by this department are highly valued both by those already established in the industry and those planning to enter it. A list of these Bulletins, dealing with regulations, tariffs, financing, statistics, and related matters is available on request. Write The Royal Bank of Canada, Oil and Gas Department, 409 Eighth Ave. W., Calgary, Alta.

We do not provide information on oil securities.

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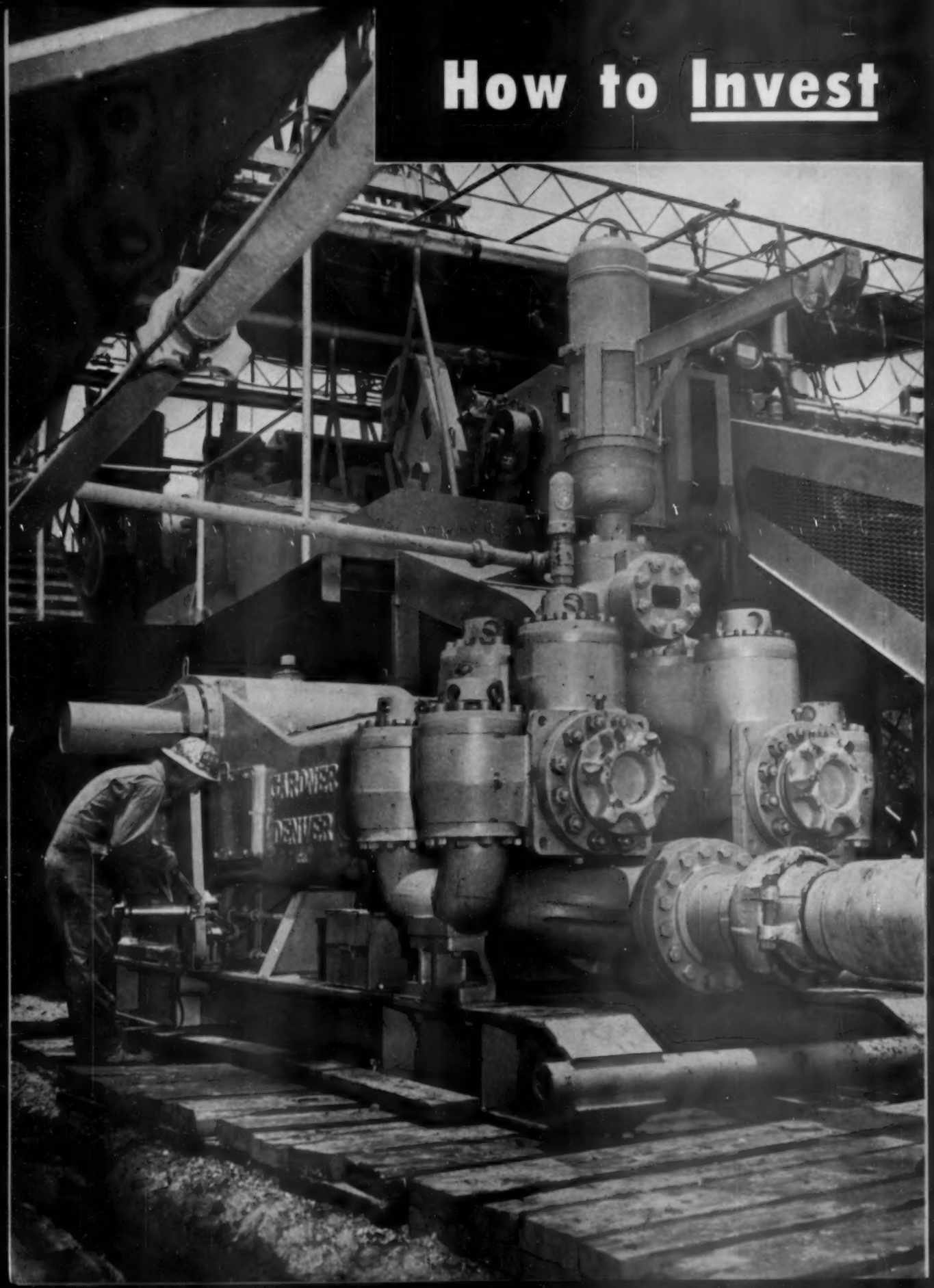

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It's the best available

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Above — Ideco Full-View Mast. Ask for literature on Ideco Drawworks, Rotaries, Blocks, Masts and Rambler Rigs.

Below — There is real assurance in the rugged strength of J&L Wire Rope.

Gardner-Denver Mud Pump at work in Mississippi. Ask your J&L Supply man for illustrated literature. Parts stocked at near-by J&L Supply stores protect your Gardner-Denver investment wherever you drill.

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Will Gas 'Freeze Out' Oil Heat?

● Gas utilities have ambitious plans to capture the lion's share of the new customers, plus an increasing number of conversions from oil.

● Heating oil marketers, on the other hand, lack a coordinated promotional plan. Equally important, there is still a need for developing a "really good" burner.

Customer Box Score

Home-heating customers in millions

	1949	1959	1969
Oil	9.9	15.5	17.7
Gas	7.4	19.0	33.0

New Housing Units Tell the Story

	1958	1959	1960-69
New housing units	1,161,000	1,375,000	12,840,000
Fuel oil			
New home installations	186,385	212,777	—
Existing customers (growth)	110,258	109,886	—
Net gain	296,643	322,663	2,200,000
Natural Gas			
New home installations	875,000	760,000*	—
Existing customers (growth)	204,000	526,000*	—
Net gain	1,079,000	1,286,000*	14,000,000

*Estimates for the 1959-1960 heating season.

The way things are shaping up, gas will have a two-to-one lead on oil in ten years in total number of home heating customers.

Many "ifs, ands, and buts" are involved in this type of forecast, but here's the key: Gas is thinking and acting big, while fuel oil marketers are still struggling to get a coordinated promotional effort off the ground.

Although fuel oil marketers are more optimistic about the future than they have been in recent years, they still anticipate only token gains.

"You might almost say that [illegible] willing to cont[illegible] crumbs from t[illegible] says one marke[illegible]

A composite [illegible] oil heat market [illegible] 2.2-million add[illegible] 1969, after losse[illegible] gas utilities pre[illegible] whopping 14-mil[illegible]

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The American Gas Assn., on the other hand, confidently predicts that 33-million customers will be using gas heat by 1969, up 14-million over last year.

Gas utilities' estimates are made on the basis of fairly concrete demand growth. A slowdown in home building—where gas expects to capture about 75% of the market—could lower the sights.

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The big promotional push on the part of gas utilities and the rapid expansion of gas pipelines into the "hard winter" areas will continue to take a toll of fuel oil sales.

If present trends continue, the growth in heating oil will be restricted mainly to areas where the demand for fuel exceeds available gas supplies. There will be some conversion from coal to oil, because of a price advantage in certain [illegible]as.

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Will Gas 'Freeze Out' Oil Heat?

● Gas utilities have ambitious plans to capture the lion's share of the new customers, plus an increasing number of conversions from oil.

Customer Box Score

Home-heating customers in millions

	1949	1959	1969
Oil	9.9	15.5	17.7
Gas	7.4	19.0	33.0

● Heating oil marketers, on the other hand, lack a coordinated promotional plan. Equally important, there is still a need for developing a "really good" burner.

New Housing Units Tell the Story

	1958	1959	1960-69
New housing units	1,161,000	1,375,000	12,840,000
Fuel oil			
New home installations	186,385	212,777	—
Existing customers (growth)	110,258	109,886	—
Net gain	296,643	322,663	2,200,000
Natural Gas			
New home installations	875,000	760,000*	—
Existing customers (growth)	204,000	526,000*	—
Net gain	1,079,000	1,286,000*	14,000,000

*Estimates for the 1959-1960 heating season.

The way things are shaping up, gas will have a two-to-one lead on oil in ten years in total number of home heating customers.

Many "ifs, ands, and buts" are involved in this type of forecast, but here's the key: Gas is thinking and acting big, while fuel oil marketers are still struggling to get a coordinated promotional effort off the ground.

Although fuel oil marketers are more optimistic about the future than they have been in recent years, they still anticipate only token gains.

"You might almost say that they're willing to content themselves with the crumbs from the gas utilities' table," says one marketing official.

A composite forecast shows that oil heat marketers expect to pick up 2.2-million additional customers by 1969, after losses by conversions, while gas utilities predict they will add a whopping 14-million users of gas heat.

The prediction for oil heat customers represents the thinking of several companies. Though studies of the market are continuing, the thinking is small. The estimates show that the number of heating oil customers will increase to only 17.7-million by 1969—after allowance for a loss of 1.5-million present users of oil heat to gas.

The American Gas Assn., on the other hand, confidently predicts that 33-million customers will be using gas heat by 1969, up 14-million over last year.

Gas utilities' estimates are made on the basis of fairly concrete demand growth. A slowdown in home building—where gas expects to capture about 75% of the market—could lower the sights.

In contrast to AGA's predictions, the promotional organization for oil heat—the National Fueloil Council—is reluctant to make estimates.

"Too many factors, which can't be pinned down now for reliable statistics, will affect the next ten years of heating to make me want to estimate just where we'll be in the heating oil industry at the end of the decade," says NFC president, Robert Gray.

"The number of families, rate of home building, population movement to outer suburbs, ups and downs of competition, new developments in equipment, relative price trends, and costs—both in the free-market and fixed-market fuels—all will have their effect," Gray adds.

Future expansion in heating oil is likely to be held chiefly to areas beyond the reach of gas mains.

The big promotional push on the part of gas utilities and the rapid expansion of gas pipelines into the "hard winter" areas will continue to take a toll of fuel oil sales.

If present trends continue, the growth in heating oil will be restricted mainly to areas where the demand for fuel exceeds available gas supplies. There will be some conversion from coal to oil, because of a price advantage in certain areas.

The inroads by gas into the home-heating market started years ago. The most noticeable impact came in the late 40s with the expansion of transmission lines into new parts of the nation—particularly in the Northeast's metropolitan regions.

Symptomatically, the rate of growth of homes using oil heat has dwindled in the last few years from 5% to 3% a year, while the number of gas-heated homes is now increasing at 6% annually.

The reason for the expected future "freezeout" of oil heat, as one marketer puts it, is that the industry has failed to promote its product.

Fuel oil marketers had automatic heating markets all to themselves for about 25 years.

Even as recently as five years ago,

marketers weren't interested in promoting oil heat in a big way.

Large companies have never felt that enough of their earnings came from fuel oil sales to allot significant proportions of their promotional budgets to boost such sales, according to one observer.

And another agrees: "Oil heat has been the promotional stepchild of the industry."

Fuel oil marketers are trying to battle gas's multimillion-dollar advertising campaign with a promotional budget of $2-million.

Oil heat promotion on an industry basis got started with the creation of the National Fueloil Council in January, 1959.

Refiners, realizing that this important outlet might dry up, rallied to support an industry promotion plan.

NFC operates with contributions from refiners and local dealer associations. It is now backed by 12 refiners, which supply an estimated 70% of the total heating oil volume east of the Rockies.

NFC's 1959 advertising budget—small as it was—totaled 2½ times the promotional funds spent in the previous year.

In 1958, fuel oil marketers spent $860,000 on heating oil promotion, compared with AGA's national advertising budget of $5-million plus—more than half of which was used to promote gas heat.

But there is some urging for a coordinated promotion effort for fuel oil. API has proposed that fuel oil suppliers and heating equipment manufacturers plan such a campaign.

A new organization, which would unify the work of such existing groups as the National Fueloil Council and the Oil Heat Institute, would strengthen fuel oil's campaign by "preventing duplication of activities and the scattering of shots," an API spokesman says.

A coordinated group, for one thing, could work toward the development of less costly, more efficient equipment. This, say industry officials, is a "must."

"Let's face it," says one fuel oil marketer, "there has been hardly any improvement in fuel or in fuel oil equipment for years.

"Development of a really good oil burner—plus the rising cost of natural gas—is our biggest hope for the future."

API already is sponsoring a project to develop better oil burners, and also to find new uses for fuel oil.

A study program being conducted at the Batelle Memorial Institute is designed to find new combustion concepts for oil burners and to stimulate and coordinate research by oil and equipment companies for oil heating growth. A report is expected by mid-March, when the contract expires.

Smart promotion and good equipment are not enough, however. Fuel oil's future depends on good service, too, says a spokesman for OHI.

"Service must be of a highly efficient type," OHI's national secretary, Charles H. Burkhardt, comments. "And the individual dealer must realize his responsibility to the public by assuming not only the sale of fuel, but the responsibility for the servicing, sale, and installation of equipment."

Jurisdictional Strife to Hit Oil

Union storm signals are flying for the oil and chemical industries. Unless something gives quickly, a big run of interunion disputes is in the making for oil. And, it would seem, the oil and chemical industries are going to be battlegrounds for more jurisdictional fights over job changes resulting from automation.

Craft and industrial union philosophies collided head-on again at last week's meeting of the AFL-CIO Executive Council in Miami Beach.

Pitted against each other are the AFL-CIO's building trades unions, and the two production unions—the Oil, Chemical & Atomic Workers, and the International Chemical Workers.

The age-old rivalries between craft and industrial unions all but scuttled last fall's master plan to squelch jurisdictional squabbles by sending them to arbitration.

The executive council had planned to discuss the arbitration proposal, which emerged from the 1959 AFL-CIO convention on the West Coast.

But the fresh flare-ups led to a general breakdown in council efforts, and the arbitration proposal was quickly put into cold storage. Whether it'll be brought out again is a moot question.

Advances in automation are the backdrop for the budding jurisdictional contests.

New equipment, electronics, and new methods have advanced rapidly in both oil and chemical industries. This means that maintenance jobs will soon be the biggest jobs in both fields.

Presently, half of the membership of OCAW and ICWU is made up of maintenance crews.

With the advance of automation, production workers are being replaced by equipment which, in turn, needs skilled overhauling and repair.

Such work can be handled more easily in one quick step than by the day-to-day repair that has been the practice. While this has been the production union's territory, it is becoming a niche for craft unions.

Attempts by the AFL-CIO's Building Trades Dept. to take advantage of it triggered the latest disagreements and controversy.

OCAW's president, O. A. (Jack) Knight, and ICWU's Walter Mitchell protested loudly. They contended their unions are losing job rights to the building trades unions via a new route—the maintenance contractor, who handles repair work on an outside contract.

Knight cited a test case involving the Toledo refinery of Standard Oil Co. (Ohio), where maintenance work is being done by Catalytic Construction Co.

He charged that this was a violation of the AFL-CIO jurisdictional code, which, in general terms, awards new construction to craft unions, and running maintenance to industrial unions. Major repair and maintenance jobs are left open to be worked out between the unions involved.

The newest trouble spot involves International Minerals & Chemical Corp. The firm awarded a maintenance contract to Wellman Lord Engineering Co. ICWU protested that it had been handling this assignment.

While the jurisdictional fight is not widespread at this point, the threat that it might be extended further prompted David J. McDonald, president of the United Steelworkers, to warn the council that any invasion of his domain by craft unions would bring on a strike.

There's no apparent solution on the horizon.

Both sides appear determined to continue their present courses, and to expand the fight.

The Building Trades Dept. is aggressively promoting the idea of its unions doing the plant maintenance work.

One of the items that was brought up before the council was a promotional pamphlet sponsored by the construction industry and craft unions. The pamphlet stressed the "value" of outside contracts for maintenance work as compared with production unions.

Civil Suit Unlikely in 'Tulsa Case'

Disappointed Justice Dept. attorneys conceded this week that the "conspiracy" charge which they had attempted to hang on 29 oil companies is pretty much a dead issue now.

In other words, there seems to be little likelihood that a civil suit will follow in the wake of the acquittal that ended the criminal phase of the so-called "price plot" last weekend.

The "not guilty" verdict came from Federal Judge Royce H. Savage, who had presided at the surprisingly short nonjury trial in the U.S. District Court at Tulsa.

He upheld the acquittal motions filed by the companies, and dismissed the government's indictment, which alleged a conspiracy to raise crude and gasoline prices in January, 1957, during the Suez crisis.

Antitrust lawyers are doubtful that a civil suit could be filed, even if the government wanted to rehash the same charges.

Pretrial speculation was that the government would press a civil suit if it lost the criminal verdict.

Attorneys point out, however, that the criminal indictment alleged just one violation: a conspiracy to boost crude and gasoline prices.

Since there was only one increase involved in the alleged conspiracy, there is nothing still going on that the government could now attack in a civil suit.

Antitrust lawyers also feel that the dismissal of the criminal indictment against all 29 companies bars the government from prosecuting companies individually on similar charges.

This possibility had been raised by Judge Savage, who commented, prior to his final decision, that he was convinced there had been no general conspiracy, but that there could be grounds for alleging smaller conspiracies.

The complete vindication of the 29 companies also gave inferential approval to the pricing methods used by the industry as a whole.

Evidence introduced by the government, and the line of questioning followed by Justice Dept. attorneys, indicated that the industry's basic operating methods were being attacked (PW —Feb.12'60p12).

But the court decision, in effect, upheld the pricing structure and procedures.

The court's final ruling noted bluntly that government evidence "didn't rise above the level of suspicion."

In addition, said Judge Savage, "I have an absolute conviction personally that the defendants are not guilty of the charge."

He disagreed completely with the Justice Dept.'s basic premise that economic and supply conditions in December, 1956, and January, 1957, did not warrant a crude price increase.

He said he was convinced that some companies had been considering price boosts long before the Suez crisis, and that they were "alert to the existence of a situation which could constitute economic justification."

The same economic pressures which prompted Humble Oil & Refining Co. to initiate a price increase also affected other companies, Judge Savage commented. He added: "The evidence certainly warrants a conclusion that there was economic justification for the move made by each of the defendants."

The court rejected the government's contention that it is illegal for a parent corporation to oversee the pricing policies of a subsidiary.

"It is my view," Judge Savage said, "that the mere approval by a parent corporation of the price schedules and pricing policies inaugurated and fixed by a subsidiary corporation does not constitute a per se violation of the Sherman Act."

Industry reaction to the swift verdict and final vindication was enthusiastic.

Typical comments:

• Robert G. Dunlop, president, Sun Oil Co.: "The day the grand jury acted, I said it was a 'preposterous, shotgun indictment.' Judge Savage's acquittal confirms that statement."

• Morgan J. Davis, president, Humble Oil & Refining Co.: "This decision justifies our faith in the judicial system."

• Fred W. Bartlett, chairman, Socony Mobil Oil Co.: "The fact that at so early a stage in the trial the case against us proved to be no case at all is dramatic recognition of the highly

Oil Man's Album

The First Electrical Log Had Its Problems

Electrical well surveying will be 31 years old this summer. The first survey was run by Schlumberger Well Surveying Corp. for Shell Oil Co. in Kern County, Calif. (above). Only one curve, a resistivity curve, was recorded—and that not continuously. The winch was stopped at three-foot intervals and an engineer noted the readings in a notebook, to be plotted later. The first electrical survey did not stand as a memorial: It was run on a dry hole.

(No. 38 in a Petroleum Week series.)

competitive nature of the oil business."

- L. F. McCollum, president, Continental Oil Co.: "We are deeply gratified but not surprised that Continental's integrity was vindicated."
- Augustus C. Long, chairman, Texaco Inc.: "We hope that this decision will cause officials of the government to consider carefully the results of their actions, and proceed in a more responsible manner before placing such unwarranted criminal charges in the future."
- Frank O. Prior, chairman, Standard Oil Co. (Ind.): "We had to spend a lot of time and money on a case that never should have been brought up in the first place."
- A spokesman for Gulf Oil Corp.: "Our pleasure over the dismissal of these charges is tempered by the knowledge that the public will long remember the headlines charging us with a criminal conspiracy when none existed."

Diesel Engines Pass Perfumed Fuel Tests

Partial findings indicate that the deodorized diesel fuel used in Cleveland's unique "smell test" produced no ill effects on the engines of the municipal buses that burned it.

The over-all experiment has been under way since last spring (PW—Oct.2'59,p15). It was undertaken by the Cleveland Transit System to determine whether perfumed additives would eliminate public objections to odors and eye irritants from diesel-powered buses.

One engine was dismounted, torn down, and examined thoroughly—with happy results for interested parties.

There were no signs of corrosion, erosion, or harmful deposits, according to the test engineers.

The research experts added, however, that the preliminary findings do not constitute an endorsement or recommendation for the additives that were used; that they are simply technical determinations.

The field "smell test" is continuing. A bus company spokesman says the experiments involve competitive additives, so that in the event the transit firm decides to expand the project, it will have alternate sources of supply.

Buses using the perfumed fuel were said previously to have passed the "smell test" with flying colors. Public reaction was favorable, and the number of complaints declined.

Six-year 'merger' study shows:

Outlets Are Key Goals

Between Jan. 1, 1954 and Oct. 1, 1959, approximately 519 complete or partial acquisitions were made by 238 oil companies. Of these, 44.3% were made by 49 integrated companies and, contrary to the industry generally, they placed more emphasis on marketing than on oil and gas producing properties.

Types of acquisitions:

	Oil & gas production		Refining-marketing		Other (including integrated)		Total
	No.	%	No.	%	No.	%	No.
By Industry (total)	309	59.5	140	27.0	70	13.5	519
By 49 Companies (total)	81	35.2	105	45.7	44	19.1	230
By 49 Companies by Years							
1959 (9. mo.)	12	23.5	32	62.8	7	13.7	51
1958	23	45.1	20	39.3	8	15.6	51
1957	15	42.9	17	48.6	3	8.5	35
1956	16	37.2	16	37.2	11	25.6	43
1955	3	13.6	11	50.0	8	36.4	22
1954	12	42.9	9	32.1	7	25.0	28
Acquisitions by 49 companies, as % of all acquisitions	26.2%		75.0%		60.0%		44.3%

Integrated oil companies are setting a fast pace for the rest of the industry in the current scramble for marketing outlets.

Graphic evidence of the changes taking place in the industry is contained in an acquisition study prepared by H. Marshall Farrier, of Continental Oil Co.'s Oklahoma City office. The study covered the period from 1954 through September, 1959.

His detailed study shows that 62.8% of the acquisitions made by 49 integrated companies in the first nine months of 1959 were marketing outlets.

In contrast, the figure for the industry as a whole, including the 49 companies, was only 36.7%.

The study also confirmed what everyone suspected—that 1959 was the biggest year yet for acquisitions within the industry.

During the first nine months there were 109 acquisitions—almost one-fifth of the 69-month total of 519.

Recent acquisitions emphasize the integrated companies' interest in marketing outlets in preference to oil and gas producing properties. This is not only contrary to the past industry trend, but is out of character for the integrated companies.

In the first three-quarters of 1959, 48.6% of the industry acquisitions involved oil and gas producing properties. On a comparable basis, the figure for the 49 companies was only 23.5%.

The "merge-or-buy" pressures are expected to persist for the next three or four years, with increasing emphasis on foreign outlets.

Farrier feels that the annual total of acquisitions will remain "at least" near the 1959 figure, but will "very likely increase."

The principal change that is likely to occur, he says, "is an increase in the emphasis on acquiring foreign marketing outlets to dispose of excess foreign crude in the face of the domestic import quotas."

An adverse legal climate or unfavorable economic conditions could impede the progress of anticipated domestic mergers, however.

"However," Farrier goes on, "it seems unlikely that the vast majority of mergers could be prosecuted as being of sufficient size to lessen competition."

What's New / IN THE INDUSTRY

Seven of approximately 50 import appellants have asked the Oil Import Appeals Board for an additional 116,800 b/d. Seven other companies are now scheduled to appear before the board in March. The pace of the hearing schedule so far indicates that the board plans to stretch out the hearings through the first half of 1960. The requests for allocations made to date are for 39,719 b/d of crude and unfinished oil, 73,425 b/d of residual fuel oil, and 3,634 b/d of light products.

The request for the largest hike in additional allocations was made by Socony Mobil Oil Co., which asked the board to boost its crude and unfinished oil quota by 27,500 b/d, to 70,800 b/d and its residual allocation by 25,700 b/d, to 26,000 b/d. Socony charged that it is being "penalized" now because it complied with precontrol requests for voluntary cutbacks. Gulf Oil Corp. requested an additional 35,000 b/d of residual and Cities Service asked for 10,960 b/d of crude and unfinished, 7,225 b/d of residual, and 3,252 b/d of light products. Gulf said it is losing money on resid sales. Cities Service told the board that if the import program fails to give "equitable treatment to us and others in the industry, it will force a major realignment in the industry."

•

Alberta's Pembina, Keystone, Carnwood, and Lobstick fields will be designated the Pembina Cardium field, effective Mar. 1. The expected designation (page 28) was made this week by the Oil & Gas Conservation Board after it decided that the four fields constitute a single accumulation of oil and gas.

•

The Louisiana Conservation Commission will investigate "unrealistic" purchaser nominations. Commissioner Ashton Mouton said nominations for crude consistently fall far short of actual purchases. The commission, he said, will attempt to track down what appears to be a widespread practice of "swapping" allowables. Records show, Mouton indicated, that some buyers nominate in some areas, but take crude from other fields where they do not list nominations.

Louisiana's March and April allowables will be continued at the present schedule, based on 35% of the March, 1953, depth bracket. That is expected to result in an initial allowable of 980,000 b/d. Nominations totaled 831,200 b/d. Actual production of crude and condensate in February is averaging 1,078,000 b/d.

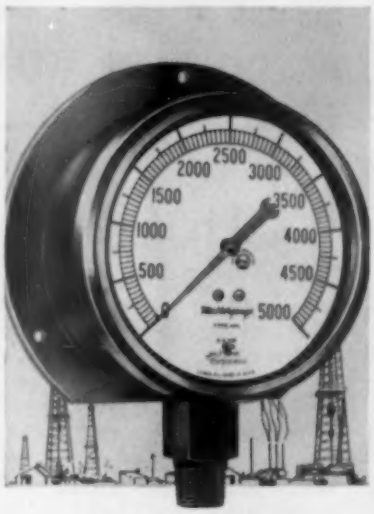
•

The Oil Import Administration has dropped its plan to boost imports of unfinished oils into the West Coast. The proposed plan would have allowed importers to bring in 25% of their crude quota in the form of unfinished oils, but each barrel of the unfinished material would have had to be counted as two barrels of crude.

•

George A. Peck

George A. Peck is the new president of Southwestern Industrial Electronics, Inc., one of the Dresser Industries. Prior to his appointment at SIE, Peck was vice-president and general manager of the electronics division of Stromberg-Carlson, at Rochester (N.Y.), where he was responsible for engineering, production, marketing, and planning for the division. Peck succeeds Keith R. Beeman, cofounder of SIE and president of the company since its organization in 1945. Beeman moves to the parent company, in Dallas, where he will investigate new product possibilities.



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"THE STANDARD OF ACCURACY"

It's That 'Bottom Line' That Counts

Remember the rash of announcements last summer by oil company managements of cuts in their refinery crude runs in the name of "industry statesmanship" to prevent excessive oversupplies?

Now look at the year-end reports of the companies. Look how many of these same managements, when addressing stockholders, are pointing with pride to their own companies' record high refinery runs in 1959. And note how often, in the next breath, they complain of sagging prices.

* * * *

What happened to all those announced refinery cuts? What happened to all that statesmanship? Why did it evaporate so fast?

It's the same story every year, whenever the industry is faced with large excess refining capacity—the same old, monotonous, and rather pitiful story:

Like the legendary fishermen lured to disaster by the Lorelei's siren song, oil company managements just don't seem to be able to resist the lure of the incremental barrel.

They can't resist the temptation of running just a little extra volume. Their sharp pencils show that the extra barrels will reduce unit costs, and thereby increase their refinery profits if prices remain stable.

But it's that "if" that's the catch—every time. For prices don't remain stable, and can't remain stable, when sales have to be pushed at discounts to move that extra supply—that incremental barrel. And with everyone getting into the same act, up shoot inventories to burdensome levels. And down go prices under the weight of the discounts.

* * * *

Look how the industry succeeded in lousing up its position during 1959.

At the beginning of the year, there were about 15-million bbl. of excess gasoline inventories, according to industry estimates. But the remaining product inventories (except residual fuel on the West Coast) were reasonably well balanced. Sound business judgment would have called for the reduction of the 15-million-bbl. gasoline excess during the year.

But the lure of that incremental barrel proved too much: By the end of May, the gasoline inventory excess had grown to 27-million bbl. above the industry's estimate of "desirable" levels. And the excess remains at around 20-million bbl. today. And distillate fuel stocks, which had been in reasonable balance at the beginning of that year, have piled up to where the excess is now estimated at around 30-million bbl.

What happened to prices as a result? The inevitable.

The Oklahoma-Group 3 gasoline price, for instance, experienced eight reductions in the last four months of the year—and today still stands about 1¢ per gal. below a year earlier.

For distillates, the Oklahoma-Group 3 price failed to recover to its February, 1959, level by half a cent during the whole year—and currently stands 1¢ per gal. below a year ago. At the Gulf Coast, the distillate cargo price lags 1.5¢ per gal. below a year earlier.

So what has the industry benefited from its record crude runs? Volume? Yes. Profits? Not really.

Look, for instance, at this calculation by one major company economist:

- Total distillate demand last year was 3.2% greater than in 1957 (the last prerecession year). Yet the return (demand-times-price) was 5.5% LESS than in 1957 (using IPAA weighted average prices).
- Total gasoline demand last year was 4.7% greater than in 1957. The return, however, was 1.3% LESS than in 1957.

Thus, the incremental barrel resulted in reduced revenues, despite higher volumes.

The situation has now become so bad that, according to industry reports, there is virtually no profit left in the refining or marketing phases of the industry. (The few companies that have been showing stepped-up profits on their higher crude runs have done so mostly on the profit from their extra crude production. The only other sharp spurts in profits have been by inland refiners as a result of the extra "windfall" realized last year from import quotas).

* * * *

Is it a surprise, then, that the stock market has been reflecting for some time its disillusionment with the oil industry profit outlook?

After all, it is still the bottom line of the income statement that counts.

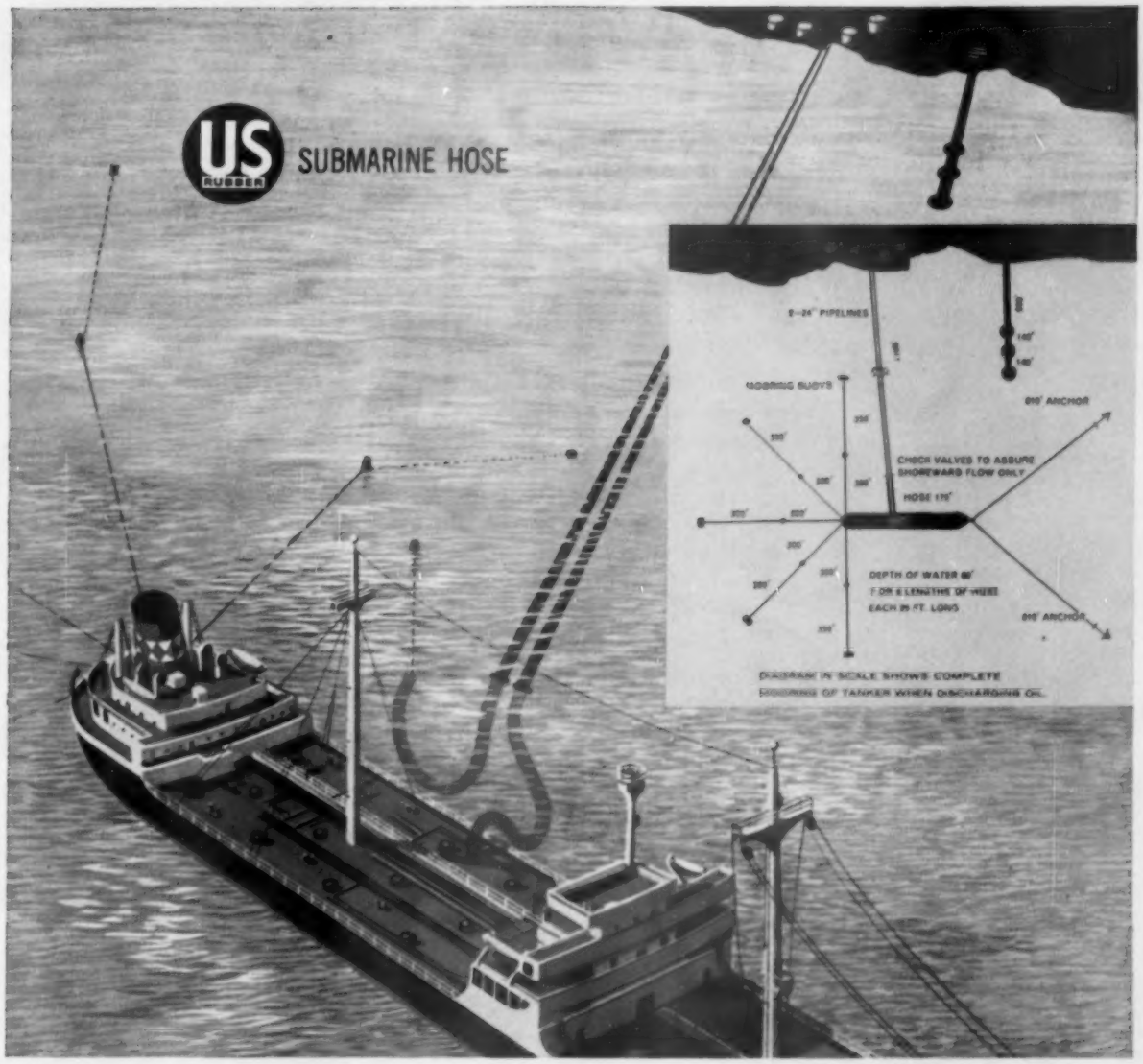
Note, for instance, the acid comment sent to customers recently by one large brokerage house:

"There is still no reason to feel oil securities have reached bottom marketwise. The industry continues to over-produce, over-refine, and over-build retail outlets. All this is done in the name of 'free enterprise,' 'competition,' etc., which may have certain merits but is most tiring to the poor stockholders, who would rather have dividends than 'position' . . . Volume, regardless of earnings, seems to be the guiding principle."

* * * *

Unfortunately, there's nothing in the industry's performance record to justify much optimism that it will learn from experience.

This industry does not seem to grow wiser with age. It just grows older.



From tanker to shore...the hook-up is U.S. Amazon Hose

The only submarine unloading point for oil tankers on the East Coast is at the Northville Dock Corp., Long Island, N.Y.

The operators say that submarine unloading would be impossible without hose of this character. Foreign and domestic tankers use this undersea hose (7100 feet offshore) as a hook-up to pipelines discharging heavy and light fuel oil directly into storage tanks on shore. Expensive dock and wharfage facilities are eliminated. *The tankers are moored at sea.*

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Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
February 19, 1960

The coal industry's push for a national fuels policy is gaining momentum in Congress. The drive, spearheaded by the National Coal Policy Conference, has as its first goal the establishment of a special joint congressional committee to assess the need for a fuels policy. Resolutions to create such a unit are pending before both the Senate and House Rules Committees. The resolutions are picking up supporters—including some oil-state senators and representatives. Oil industry representatives in Washington concede that opposition is becoming difficult to muster.

But it is likely that coal men may have to soften the language of their proposal before adoption. The resolutions as presently worded are too sweeping in scope, oil spokesmen argue. They fear that the coal industry's idea of a national fuels policy amounts to carving out a large share of the fuels market for coal's exclusive use. Coal leaders reportedly are giving serious consideration to such a compromise—sponsoring a more equitable study. If the resolutions are changed, there is a good chance Congress may approve them this year.

•

Two Federal Power Commission examiners are trying new hearing procedures in an effort to reduce the regulatory time-lag. Examiner Joseph Zwerdling has ordered three separate presentations of issues in Tennessee Gas Transmission Co.'s request for a $26.6-million annual rate increase. Zwerdling will hear testimony on the rate-of-return issue in April. He hopes to get a quick interim decision from the commission on that issue soon after the hearings. Then, in May, he will hear depreciation and gas cost testimony. The final stage of the hearings would be started in September for determination of remaining issues, including rate schedules. Examiner Harry W. Frazee, acting similarly, will hold initial hearings in May on a $10.7-million rate increase sought by Northern Natural Gas Co. He hopes for an interim ruling on rate of return and cost allocations, with the company eligible to put into effect a portion of the rate increase before the entire case is concluded.

Some transmission company attorneys question the feasibility of dividing cases into separate phases. They wonder whether time can really be saved, and whether the result might not be almost twice as much expense and time. But FPC's staff, which recently suggested two-phase hearings on rate cases (PW—Feb.12'60,p18), favors an attempt to cut down lengthy consideration. And pipeline customers—mostly utility firms—also support the idea. Now, with Zwerdling and Frazee readying their new procedures, the gas industry may learn this year whether such efforts will be true short-cuts or only equally slow routes.

•

Firm Administration support for a natural gas bill is the immediate goal of gas producers. Backers of gas legislation are concentrating on efforts to get the Administration—preferably, President Eisenhower personally—to tell Congress once again that a bill is needed. Moreover, producers hope that Eisenhower will use his prestige and position to seek votes for a bill in Congress. Several gas bills are still pending in Congress, including one by Rep. Oren Harris (D., Ark.) which previously has had the support of most producers.

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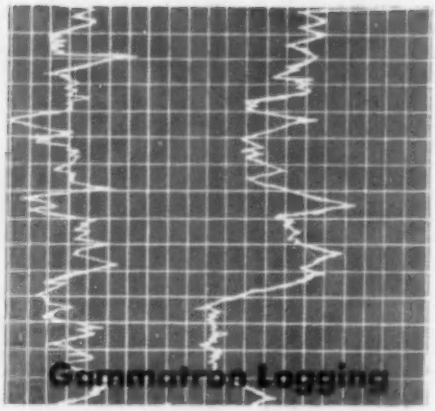

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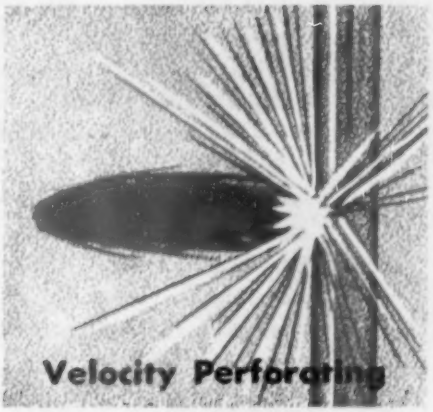

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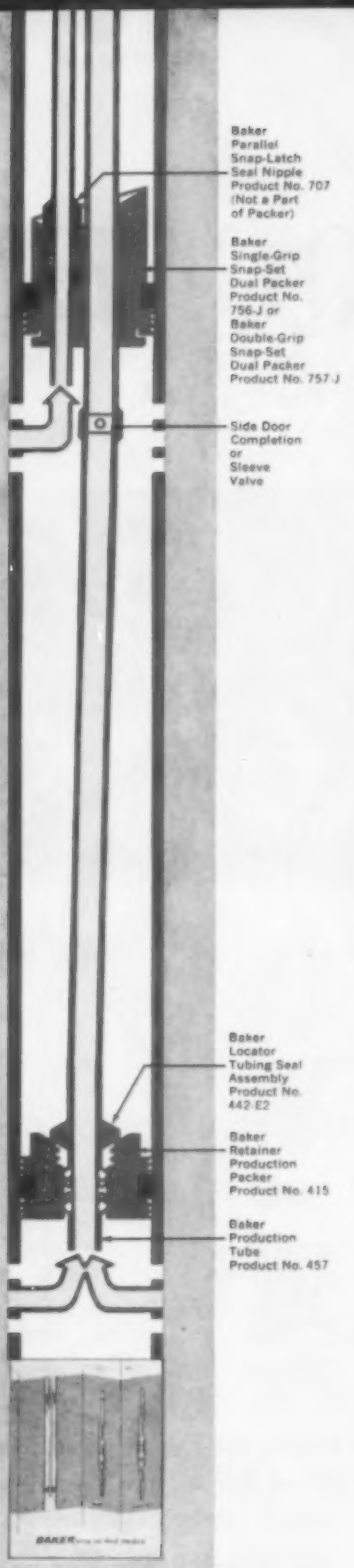
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CATALOG SUPPLEMENT NO. 357 describes Baker Snap-Set Dual Packers in complete detail.

BAKER OIL TOOLS, INC. HOUSTON LOS ANGELES NEW YORK

Watch the Central Williston Basin

Look for next week's big lease sales in North Dakota to reflect the importance of the recent oil discovery in McKenzie County by Shell Oil Co. and Northern Pacific Ry.

The Bank of North Dakota will offer 6,068 acres in the county on Feb. 23. On the following day, the State Land Dept. will offer 49,616 acres in the county, along with 337,216 acres in nine other counties—making it the largest lease sale in state history.

A land play already has developed out of Dickinson, about 30 mi. southeast of the discovery.

The Bureau of Land Management had to hold a drawing in mid-December to determine which of 53 simultaneous applicants would be awarded a tract of 1,791 acres 2 mi. east of the well. Robert Balsam, a Billings (Mont.) broker, "won."

The Shell-NP discovery opens up a huge, untested area in the central portion of the Williston Basin.

The discovery—No. 32-15, section 15-145n-101w—was the third test of a series drilled by the two companies on a block totaling about 185,000 acres.

The well is from 20 mi. to 40 mi. north and northwest of production at Dickinson, Fryburg, Belfield, and Scoria, and about 35 mi. southeast of Amerada Petroleum Corp.'s Signalness Unit discovery in adjoining Dunn County.

The pool opener is in the heart of the Dakota badlands—noted for their ruggedness and desolation (picture). Dropoffs of 600 ft. with steep cliffs —typical badlands topography—are common in the area.

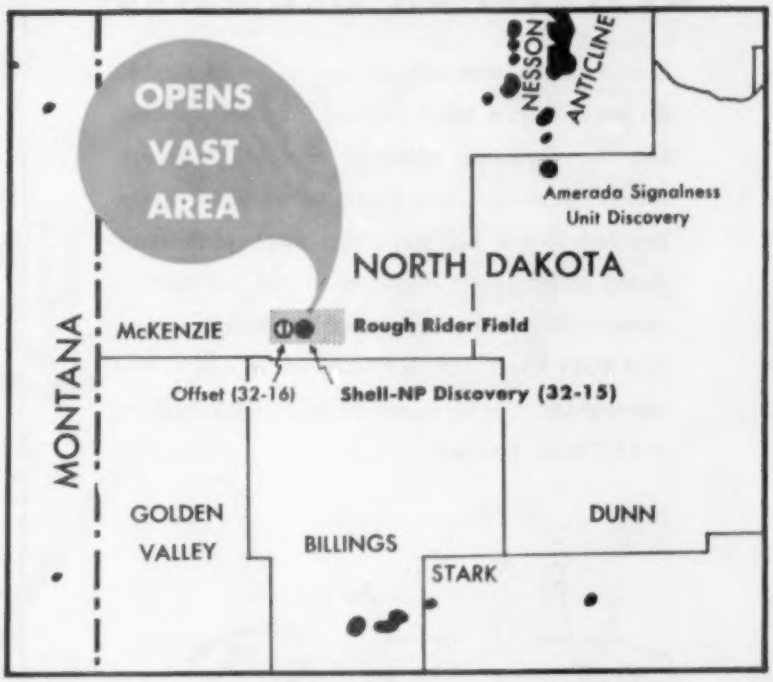
The Little Missouri River lies 5 mi. west, and the hamlet of Grassy Butte is 16 mi. east. The well location is 16 mi. from the nearest highway, "as the crow flies, but 30 mi. as the truck crawls," as one Shell geologist puts it.

The 1,536 b/d discovery was drilled on a symmetrical anticlinal feature with an east-west axis.

The 39.7-gravity oil was produced through ½-in. choke and perforations at 9,375-410 ft. in the Mission Canyon, Madison Group, of the Mississippian.

John Tuttle, division production geologist for Shell at Billings, says there are 18 ft. of net pay. Average porosity is 17.1% and average permeability is 3-1 millidarcies.

The east-west axis is in itself of interest, since nearly all previous structures found in the area have been on a north-south, or northwest-southeast trend, such as the Nesson and Cedar Creek anticlines.



SHELL-NP's No. 32-15, 1,536 b/d discovery opening Rough Rider field, is expected to touch off heavy wildcatting in this untested Williston Basin area.

RUGGED TERRAIN of the Dakota badlands is caught in this aerial shot of Shell-NP's discovery. Roads are so bad full-size trucks cannot be used to haul crude.

The operators last week staked the first confirmation offset 1 mi. to the west.

Drilling of the new test, No. 32-16, has been held up by muddy conditions arising from a chinook (warm wind) sweeping the hills. A successful confirmation would lend greater impetus

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to exploratory drilling in the deeper portions of the basin.

The newly-designed Rough Rider field already has made history on another count—it is the first field in which 320-acre temporary spacing has been issued for the Madison formation in North Dakota.

The order, issued in late January by the North Dakota Industrial Commission, is also significant because of the commission's reasoning.

The commission found that "technical and engineering knowledge relative to the mechanics of oil and gas reservoirs has made tremendous advances and . . . previous spacing practices in a less enlightened era should not be allowed to prevent the application of this new knowledge to present producing oil and gas reservoirs."

The Silurian pool at Beaver Lodge field is on a 320-acre pattern, but 160-acre spacing applies to the Devonian, and 80-acre spacing to the Madison.

The Beaver Lodge Silurian pool is the only other pool on 320-acre spacing in the state.

In requesting the wide spacing, Shell gave these reasons:

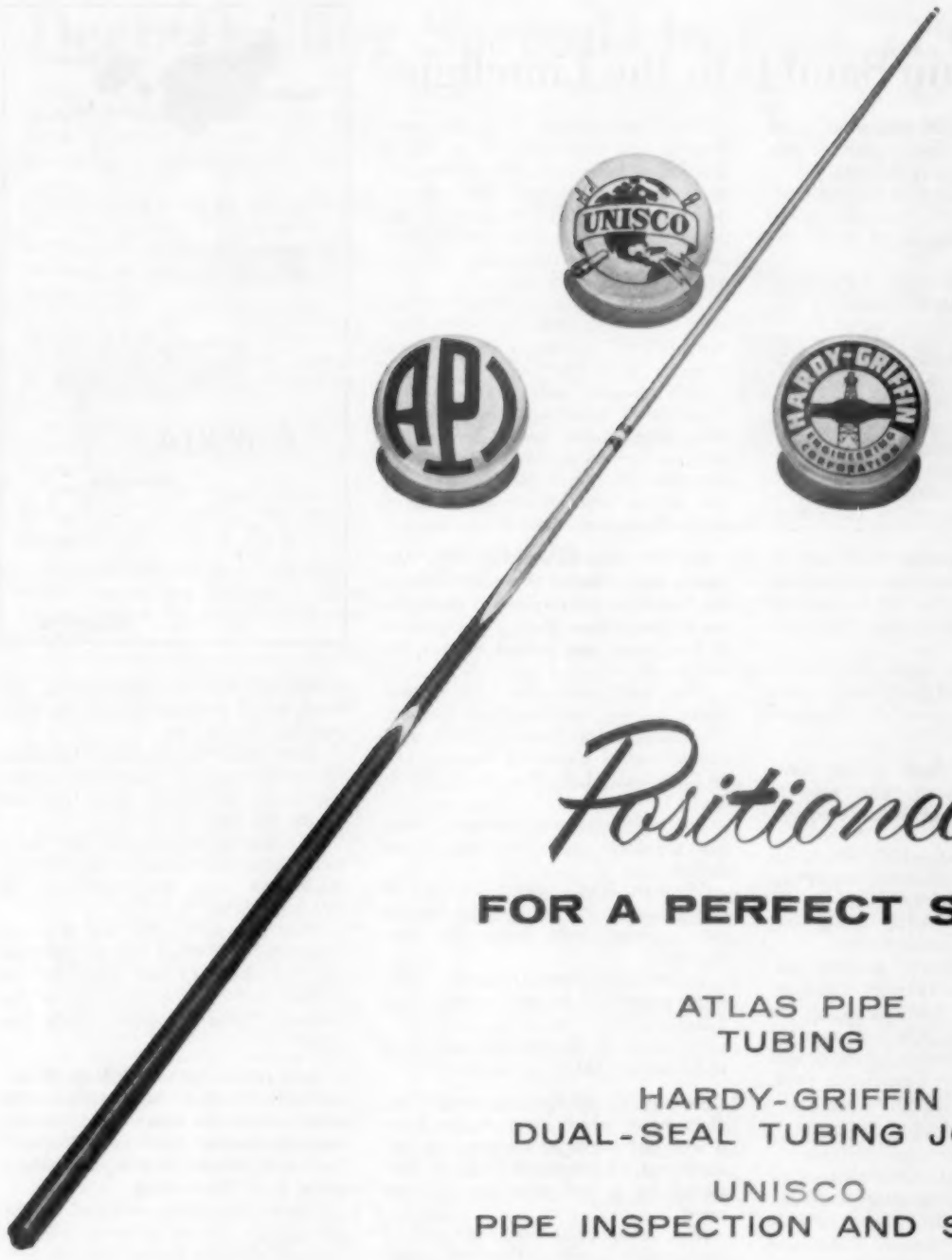
- The effective porosity and permeability is not great enough to drain large areas.
- Rapid development in a wide area will result.
- The district is remote from an outlet; wide spacing will encourage establishment of a gathering system to offset high trucking costs.
- Optimum density can be determined early with the gathering of data on a wide pattern.
- Need for pressure maintenance or other projects can be determined sooner.
- If infill wells are necessary, they can be drilled later—but the converse is not true.

A Shell spokesman also noted that crude is being trucked to the Butte Pipeline at Glendive, Mont. The trucking price for this distance should be 77¢ pre bbl., but the roads in the badlands are so poor that full-size trucks cannot make the trip. So it costs about $1.30 to $1.40 per bbl. to shuttle the oil on smaller trucks.

The net from the oil now is $1.30 to $1.40 per bbl., but this is expected to increase by about 50¢ per bbl. when good roads are built.

An interesting sidelight: The Rough Rider field discovery is Shell's and NP's first in North Dakota.

The pair has operated as a very successful team in the Williston Basin's Cedar Creek area, in Montana, but had not been able to hit in North Dakota until No. 32-15 was completed in December.



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In Alberta . . .

Cardium Sand Is in the Limelight

Two developments this week point up the growing significance of the Cardium sandstone in Alberta.

The Cardium sand is the principal producing zone at Pembina, where new field limits appear to be in the offing.

And some 90 mi. south of Pembina, a new Cardium play is expanding into what looks like a 40-mi. trend.

The first development involves four Cardium pools in the Greater Pembina area. These may be designated as one field—which would then be one of the largest in area in the world.

The provincial Oil & Gas Conservation Board held a hearing on the proposal in early February. A quick decision is expected.

The board is expected to rule in favor of the big-field designation on the grounds that the fields involved produce in common from the Cardium sandstone.

This is in line with the board's definition of a pool as a single source of hydrocarbon accumulation separate from other sources.

The proposed field would have 3,101 Cardium wells, and take in most of four present areas, comprising 513,100 acres.

The areas considered for incorporation and acreage involved, are: Pembina, 410,060 acres; Lobstick, 22,400 acres; Keystone, 70,720 acres; and Carnwood, 9,920 acres.

A board spokesman pointed out, however, that the Lobstick Cardium pool covers only 8,480 acres of the field's total acreage. The total number of wells in the proposed field would be second only to East Texas field, which has about 19,300 wells.

Reserves of the new field would be large.

It's generally estimated that oil in place at Pembina is around 4.2-billion bbl., of which 5% to 20% is recoverable under primary drive, and possibly 30% under waterflooding, or other secondary-recovery method.

Combined reserves of Carnwood, Keystone, and Lobstick amount to about 50-million bbl., according to rough estimates. Of this, Keystone accounts for some 34-million bbl.

Numerous complexities are involved in the decision.

These include the need for adopting administrative practices that could provide for a variation in the size and effective period of the economic allowance in parts of the pool.

One operator sums it up this way: For the first seven years of its life, a well has a higher operating economic allowance, so that well cost can be paid out sooner. After seven years, the operating economic allowance drops to normal. The latter allowance includes daily operating costs only.

The problem arises because Pembina field wells date to 1954, Keystone to 1957, Carnwood to 1958, and Lobstick to 1959.

"It's obvious," adds this operator, "how small owners of wells drilled later than others would feel if all wells, as part of one big pool, received the same economic allowance, effective at the same time, regardless of when they were drilled."

In the second development, the young and growing Westcott field in the Carstairs gas region has strengthened speculation that the Cardium in that area may extend over a 40-mi. trend.

The field itself, which is located about 35 mi. northwest of Calgary, was discovered in January, 1959, with completion of Canadian Superior Oil of California, Ltd., No. 8-31, lsd 8-31-30-3w5.

Six wells are now producing from the Cardium and two are being drilled.

Westcott field is operated by Stekoll Oil & Gas, Ltd., on acreage farmed out predominantly from Canadian Superior.

Recoverable reserves from the 2,000 acres proved so far are estimated at 2-million bbl.

Original oil in place is estimated at 12-million bbl.

Probability of the apparent Cardium trend, which seems to run from a well just north of Calgary to just northwest of Westcott field, is bolstered by a well near the midway point.

The producer at the south end of the possible trend is Western Leaseholds No. 8-34 West Beddington, lsd 8-34-25-1w5, about 4 mi. north of Calgary city limits. The discovery was completed in 1957; present production is about 25 b/d.

The midpoint producer in the apparent trend is Shell Oil Co. of Canada No. A-13, lsd 13-2-28-2w5, which was completed in the fall of 1956 as the first Cardium producer in southern Alberta for 138 b/d.

It is Shell's only oil producer in Crossfield field, since the company is "not playing for Cardium oil" at Crossfield, but is concentrating, instead, on gas production from the Mississipian formation.

Aside from these positive Cardium oil discoveries, there have been numerous spotty oil shows along this line during the past few years.

The northernmost traces have been found as far northwest as the Harmattan-Elkton area, just northwest of Westcott field.

Most observers agree that it is unlikely that the trend will be continuous for 40 mi., but they do say further drilling may uncover an important Cardium reservoir along this trend.

And while further drilling is admittedly needed to determine to what extent the trend is continuous, two discoveries south of Westcott field add weight to the possibility a trend is in the making.

About five miles southeast of the field, Cree Oil of Canada (1958), Ltd.; Canadian Export Oil & Gas; Alminex, Ltd.; and Provo Gas Producers last fall completed No. 6-2 Carstairs, lsd 6-2-30-3w5, for 250 b/d of oil.

The second venture, Canadian American Royalties, Ltd., No. 6-35 Carstairs, lsd 6-35-29-3w5, was completed 1 mi. due south of the No. 6-2 well.

A linkup between the two discoveries and Westcott field, says one operator, would make a field about 1 mi. wide with recoverable reserves estimated roughly at 10-million bbl.

Deep Drilling Spreads in East Texas

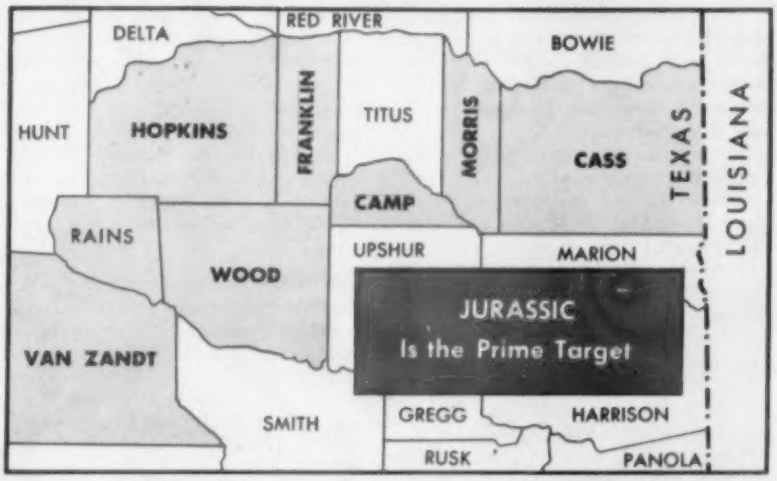
Exploratory drilling into the deep-seated Jurassic formation of East Texas is hitting a record pace and providing a pickup for the entire area.

Exploration of the Jurassic, a formation long regarded as a promising pay for East Texas, has been marked by intermittent successes and subsequent leasing plays.

But in this current drive, which is less than a year old, nine Jurassic wildcats are either being drilled, ready to be started, or planned in a six-county area.

Most of them are aimed at the Smackover lime, third member of the Jurassic series.

The total is the largest since the first Jurassic production was established in East Texas in 1944.



SEVEN COUNTIES in East Texas are being tapped in the search for production in the Jurassic formation. Drilling includes nine wildcats and four development tests.

Three of the nine Jurassic wildcats in the region are located in Cass County, where the deep drilling play started.

The deep exploration began in mid-1959, when Pan American Petroleum Corp. completed a well that produced 43.1-gravity to 51.9-gravity oil from three different sections—9,800 ft., 10,200 ft., and 10,600 ft.—in the Cotton Valley, upper member of the Jurassic.

This well, which opened up East Linden field, was hailed as the first oil discovery from the Cotton Valley in East Texas.

Currently in Cass County:

- Shell Oil Co. is drilling below 10,500 ft. on a 12,000-ft. permit to test the Smackover at No. 1 V. B. Allsup, B. F. Lynn survey, 2½ mi. southeast of Bryans Mill townsite and 20 mi. north of East Linden field.
- An independent combine headed by H. L. Gist, Tyler, is drilling below 8,500 ft. on an 11,500-ft. permit to test the Smackover at No. 1 T. R. Harrel, John Stiles survey, 4½ mi. southwest of Douglassville.
- Gist, Pan Am, and Sunray Mid-Continent are preparing to start drilling soon at No. 1 Grant unit, Laveria Moren survey, 2 mi. southwest of Bivins townsite and about 6 mi. northeast of East Linden field as an 11,600-ft. test to the Smackover.

Van Zandt County follows with two Jurassic wildcats being drilled.

Later, after the discovery of East Linden field, Van Zandt County entered the Jurassic play with the completion of Pan Am No. 1 W. A. McCoy, James Cheshire survey, 1 mi. southeast of Fruitvale and about 90 mi. west of East Linden field.

This well, the first to produce from the Cotton Valley and the first triply completed on the west side of the East Texas area, was completed for gas and condensate production from 10,500 ft. in the Cotton Valley and for oil from two sections in the Rodessa above the Jurassic.

The current Jurassic operations now active are:

- Pure Oil Co. and Texaco Inc. No. 1 J. G. Flatt unit, V. B. Hubbard survey, 7 mi. west of Martins Mill townsite in the abandoned 1-well Tundra (Rodessa) field, is below 6,200 ft. on a 13,500-ft. permit to the Smackover.
- Sinclair Oil & Gas Co. is drilling below 5,000 ft. at No. 1 Glenn McClennan, F. W. Wrede survey, 3 mi. south of Edgewood townsite, as a 10,700-ft test to the Smackover.

The remaining four Jurassic wildcats are located in Camp, Wood, Hopkins, and Morris Counties, the latter being one of the few counties in East Texas with no oil or gas production.

- W. O. Irvin and E. B. Germany No. 1 Joe Justiss, J. D. Nelson survey, Morris County, 5 mi. northwest of Daingerfield, was being tested through casing perforations at 12,587-687 ft. and 12,737-67 ft. in the Smackover at last report.
- Pan Am is drilling below 8,600 ft. at No. 1 John D. Henderson, Harrison County school land survey, Camp County, on a 13,200-ft. test to the Smackover.
- Shell Oil is drilling below 7,000 ft. at No. 1 C. M. Mayes, Jasper County school land survey, Hopkins County, 4 mi. southeast of Sulphur Bluff in Mitchell Creek (Paluxy) field on a 10,700-ft. permit to the Smackover.
- Pan Am is preparing to spud No. 1 J. B. McKee, Oscar Engledow survey, Wood County, 4 mi. northwest of Yantis townsite. The permit is for 13,700 ft. to the Smackover.

This operation is 6 mi. northeast of the shut-in, 1-well Ginger field of Rains County, a 1951 gas-condensate discovery through a series of perforations between 11,958 ft. and 12,126 ft. in what most geologists classify as the Buckner lime, second member of the Jurassic series.

There is no other Buckner discovery in East Texas.

In addition, four development tests currently are aimed at the Jurassic, three of them in Franklin County.

These three are being drilled by Tidewater Oil Co. in New Hope (Jurassic) field under a unit development program that includes a sulfur recovery plant.

The remaining development test is being drilled by Pan Am in Cass County's East Linden field, which now has three wells producing from the Cotton Valley producers.

During the 16 years since the first East Texas Jurassic field (Eylau field, Bowie County) was discovered, 13 Jurassic discoveries have been made.

Outside of the Mexia-Talco fault trend, which yielded four producers, there has been no definite pattern to the discoveries.

In fact, the more recent discoveries have followed the usual exploration procedure of finding a structure and drilling deep enough.

Tariffs Favored Over Oil Quotas

The "fairest and least injurious" way to restrict oil imports is through tariffs, not quotas, members of the American Institute of Mining, Metallurgical & Petroleum Engineers were told this week.

But, at the same time, William H. Peterson, associate professor in the Graduate School of Business, New York University, questioned the need for any restrictions at all.

Peterson, speaking at a Mineral Economics session at AIME's annual meeting in New York, added:

"The U. S. oil restriction policy breaches the policy of greater international trade and the flow of earnings to foreign oil economies and peoples, and invites retaliation against American exports.

"It is a poor answer to the current Soviet policy of economic penetration in underdeveloped nations, such as in the Middle East."

He added that development and maintenance of overseas oil production facilities by American capital, with access to the American oil market, is a "necessary corollary" of the national security.

A Texas operator re-emphasized the vital role of the independent—both in the petroleum industry and to the consumer.

Estill S. Heyser, Jr., president of the Texas Mid-Continent Oil & Gas Assn. and partner in Heyser & Heard, Dallas, noted that independents account for 80% of all domestic drilling, about 45% of crude production, and nearly half of all reserves.

He added that there are some 25,000 individuals, firms, and companies in the independent category.

Heyser told AIME members:

"The demand for energy continues to grow in this country, and one of the greatest safeguards for the American consumer has been policies which allow independent firms to keep pace with the growth in demand."

Threats to the independent, he continued, included proposals to use foreign oil to conserve domestic oil, to control producers' prices of natural gas, and to assign fuel markets under a federal fuel policy, as advocated by the coal industry.

The Texas independent also contended that the present imports policy protects domestic independents.

In his comments on the imports situation, Heyser differed markedly from the views expressed by Peterson. Heyser, taking note of the bitter controversies that have marked the development of the imports program, said: "I believe it is fair to say that policies prevailing today at each level operate to preserve the independent as an important part of the U. S. petroleum supply mechanism."

He attacked the principle that imports conserve domestic supplies, contending that "a barrel of oil which hasn't been found can not be conserved."

A Shell Oil Co. spokesman recommended that natural gas should command wellhead prices "commensurate with its impact on the energy market."

W. B. Golush said that, by 1968, gas is predicted to supply 72% of the petroleum energy consumed in those markets where gas and hydrocarbon liquids are in competition with each other.

He urged the petroleum industry to intensify its exploration efforts to find an annual average of 26-trillion cu. ft. of gas over the next ten years. This much is needed, Golush said, to back up the predicted 5% annual increase in gas demand.

In stressing the need for higher wellhead prices, Golush suggested that the prices paid for natural gas at the wellhead should be set by normal supply-demand relationships.

"The real test of the right price for gas," he said, "is found in the market place, where it competes with other forms of energy."

Golush contended that "unless the percentage revenue contribution of natural gas to the petroleum industry more closely approaches its share of the energy consumed, it is available to meet the indicated demand."

On the financial front, a New York broker told AIME that oil and gas stocks appear to be depressed and, therefore, could be attractive to investors.

Gilbert H. La Piere, of W. E. Hutton & Co., noted that current value of oil common stocks approaches $43-billion, about the same value they held 2½ years ago.

At that time, he said, the public had more money invested in petroleum than in any other industry. Today, however, oil shares have slipped to third place, behind utility and chemical stocks.

La Piere said that an investor should not be too alarmed at these statistics, because the petroleum industry has undergone a period of tremendous expansion during its first 100 years.

"Anyone analyzing the petroleum industry," he added, "realizes that the industry has gone through two of its most difficult years.

"I believe the worst is over. The industry recognizes the problems that exist and is taking steps to correct them.

"With values present and earnings and dividends apparently safe, an investor should have some portion of his portfolio in the more attractive oil and gas securities."

To support this, La Piere pointed out that the oil and gas share of the U.S. energy market is expected to increase to 75% by 1967, and that demand is expected to reach 14-million b/d by that time.

Glass Capsules Help Stimulate Wells

The force generated by air rushing into a vacuum can be used to stimulate oil and gas wells, says the Dowell Division of Dow Chemical Co.

Dowell, which has used such a method in about 50 wells, says special glass capsules (left) are lowered into a well on wireline or tubing, positioned at the selected point, and imploded by pressurizing the fluid in the well.

The resulting implosion will shatter adjacent rocks, remove mud cake from the well bore, and lower well injection pressures. This technique, according to Dowell, is particularly useful in hard, dense formations.

The capsules now in use are 4 in. in diameter and from 8 in. to 4 ft. in length. They can be used in tandem, as shown in the picture.

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New steels are born at Armco

Suppose you are planning a pipe line that calls for 16-inch-diameter steel pipe with .172-inch minimum wall thickness. There is no need for you to settle for the .250-inch thickness available from most suppliers. Armco has 132 different diameter wall thicknesses, enabling you to meet your requirements *exactly* . . . without buying "surplus" steel.

Armco Pipe is supplied in lengths up to 50 feet instead of the ordinary 40-foot or double-random lengths. The longer lengths mean fewer field joints—you save welding and handling time.

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Geophysical Records Dually Displayed

A California geophysical company has deveolped a time- and eye-saving dual display of variable amplitude superimposed of variable density, enhancing the advantages of both.

The technique, developed by Western Geophysical Co., of Los Angeles, makes possible the dual display on standard photographic paper, with use of special developers and methods.

Advantages of the variable amplitude presentation are its accuracy in timing the arrivals of the first breaks and reflections, and its facility for trace-by-trace detail studies.

Variable density also has certain optical advantages. Looking at a variable density section from a distance, a geophysicist can see the bedding at a glance.

When the two are combined, the variable density automatically picks up the records. The geophysicist can spot significant events—even apparently minor ones—more quickly than he can on a simple variable amplitude section, and can compute them more accurately than on a simple variable density section.

A superimposed dual-display camera makes possible the display.

The camera is possible because the company's research staff worked out a method for reproducing the original magnetic tape record in the form of variable density. This was done by use of conventional galvanometers, instead of the 24 individual glow lamps and extra amplifiers required for other 24-trace variable density systems.

In reproduction of variable amplitude, the impulses from the tape activate galvanometers within the camera. Light is focused on the mirrors of these galvanometers. As the galvanometers swing from side to side in response to the impulses, the beams from the mirrors trace squiggly paths on the sensitized paper moving past the aperture.

In variable density recording, however, it is necessary to achieve varying shades of gray in what might be termed "tone blocks."

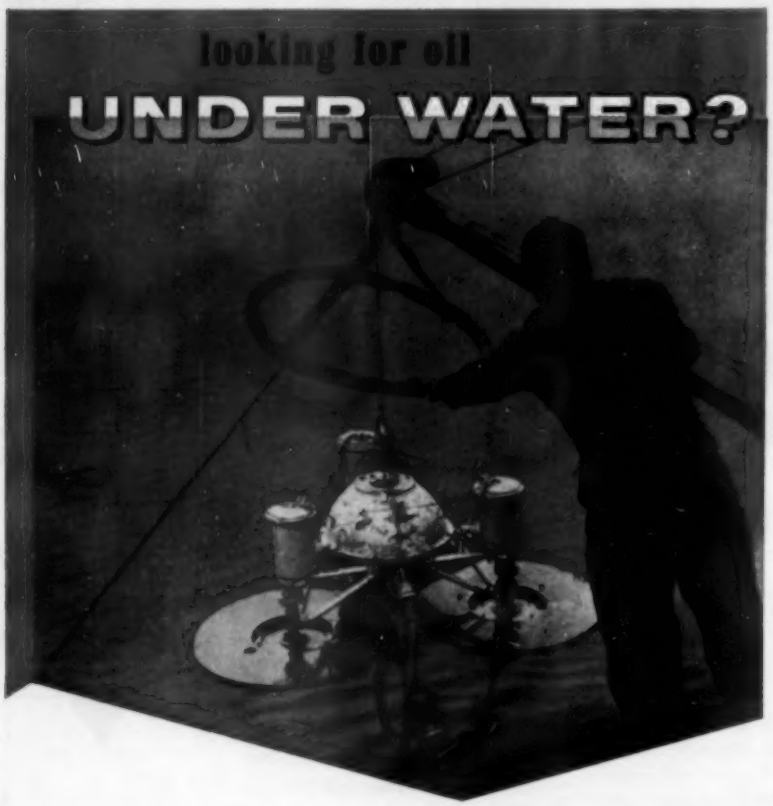
In variable amplitude, the wider the swing of the galvanometer in response to the amplitude of the signal, the farther the squiggle trace moves on the paper. In variable density, the wider the swing of the galvanometer, the stronger is the light beam reaching the paper and, therefore, the darker the tone.

Research men succeeded in mounting galvanometer blocks for both variable amplitude and variable density in the camera housing in such a way that the beams from each strike the photographic medium simultaneously.

At the same time that this arrangement was perfected, light diffusers and optical wedges were eliminated. The result has been greater fidelity to the original signal, since the optical system loses none of the frequency range enroute to the paper, and because the "light gate" substituted for conventional aperture permits a greater area of the beam to reach the paper.

Records are produced 24 traces at a time—rather than one trace at a time as in sequential systems.

The density of light on each trace can be adjusted to the desired standard, much more closely than the human eye can judge, by means of a photometric monitoring device. Record sections of exceptional uniformity are said to be the result.



Murky or clear, water can't cloud the answers to your exploration problems when a GSI underwater gravity party goes in search of them.

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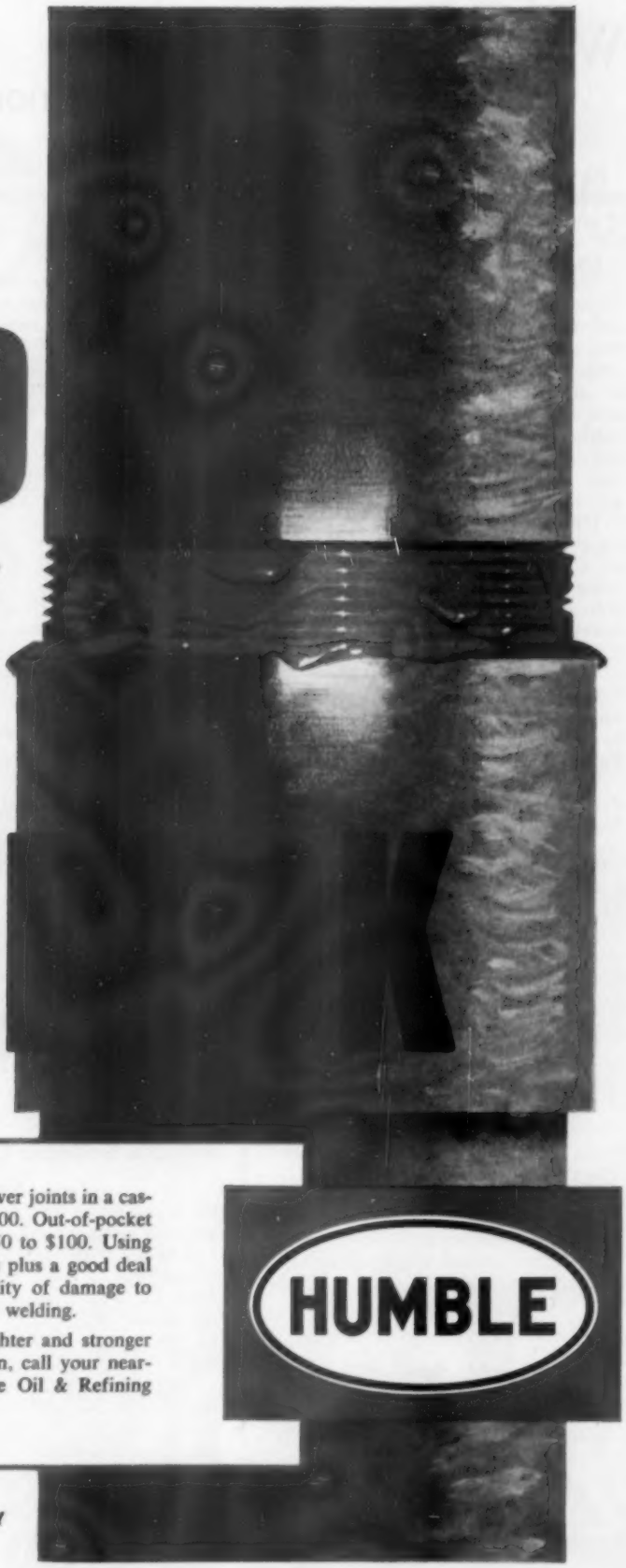

Your own crew can lock and seal the lower joints in a casing string with THREDLOK for about $10.00. Out-of-pocket costs of welding would be approximately $50 to $100. Using THREDLOK, you can save $40 to $90 *cash* plus a good deal more in time, and you prevent the possibility of damage to high strength casing that could be caused by welding.

THREDLOK seals and locks joints tighter and stronger than tack welding. For complete information, call your nearest Humble bulk plant, or contact Humble Oil & Refining Company, Houston, Texas.

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

An Interior Dept. official recommends raising the minimum rental for oil and gas leases on public lands to 50¢ a year each year.

The law now provides for a rental of 50¢ the first year, nothing for the second and third, 25¢ for the fourth and fifth, and 50¢ for the sixth through the tenth years.

George Abbott, department solicitor, also favors pending bills to eliminate separate lease and option acreage restrictions, counting them together and establishing one figure of 246,080 acres that could be held by one person, except in Alaska.

There, the department favors keeping the present limitation of 100,000 acres under lease and 200,000 acres under option, with an additional 300,000 acres permitted above the Brooks Range.

•

Two suits seeking to prevent fracturing or acidization of gas wells on townlots will be heard May 11 by Texas' Third Court of Civil Appeals.

The hearing follows a lower-court decision favoring A. W. Gregg, who holds two townlot drilling permits to tap the Hansen sand reservoir in Pharr, Hildalgo County.

Plaintiffs Delhi-Taylor and Mayfair Minerals charge that Gregg plans to stimulate production artificially from reserves under his townlots, but that such action in effect would lead to drainage of their reserves.

In asking the court to prohibit any such stimulation, "which would physically invade the plaintiff's premises," the two companies specifically mentioned fracturing and acidization.

One of Gregg's tests is reportedly being drilled within 10 ft. of leases operated by the Delhi-Taylor group.

The lower-court ruling was to the effect that the plaintiffs failed to exhaust administrative remedies through the Texas Railroad Commission before going to court.

•

Bidders paid bonuses totaling $41,796 for leases on 28,211 acres at the February sale of Colorado state lands.

High bid at the sale was $8.25 per acre for 160 acres in Kiowa County, in the Las Animas Arch area, paid by independents Gilbert Fowler and Jay O. Gallagher.

Most of the 46,137 acres offered were located in the eastern part of the state.

•

British Petroleum Exploration Co. (Alaska) Inc., will conduct geological studies in Alaska this summer.

The company has taken leases on about 50,000 acres in the Umiat region and options on 120,000 acres in the Umiat and Gubik area, in addition to a small tract in the Copper River Basin.

BP also has acquired an interest in a test being drilled by Paul G. Benedum in the Nulato Basin.

•

Three new oil fields were discovered in Illinois during January.

The new fields are Louisville South, Clay County; Mattoon North, Coles County; and Springfield East, Sangamon County, according to a State Geological Survey report released this week.

Springfield East field was discovered with the completion of Aladdin Oil Co. No. 1 Scott, section 21-2s-4w, for 528 b/d through ½-in. choke from the Silurian limestone at 1,605 ft.

•

The Wyoming State Land Board has suspended for 90 days the rules affecting relinquishment of oil and gas leases on state-owned land.

Land Commissioner Ken Bell says the suspension was made to permit a board study.

He says the rules now provide that leases must be given up after ten years if no development work has been done, but don't give preference to the previous holder in obtaining another lease on the property.

•

Atlas Pipe Inc., Houston, and Bradford Supply Co., Bradford, Pa., will merge to form Atlas Bradford Co., a Texas corporation.

Atlas is a finisher and distributor of oilfield tubular goods. Bradford Supply presently has 16 branches and five shops. The merger is expected to become final about Mar. 1.

•

Baash Ross Division of Joy Mfg. Co. has bought Web Wilson Oil Tools, Inc., of Los Angeles.

Terms of the transaction were not disclosed.

Web Wilson, which makes tongs, elevators, and Hydra-hooks, will be integrated into Baash Ross.

•

Baker Oil Tools, Inc., last week acquired Hayward Testing Service, a California firm.

Hayward was engaged principally with cementing collars and related operating and testing tools.

Price was not disclosed.

•

Bowen Itco, Inc., has purchased all assets of the 35-year-old Kinzbach Tool Co., Inc.

The two companies' headquarters occupy adjoining pieces of property in Houston.

The addition of the Kinzbach line of oilfield tools—whipstocks, mills, casing mills, stuffing boxes, tubing spiders, and relief valves—will complement Bowen-Itco's own diversified line of oilfield specialty tools for the fishing, drilling, production, and wireline phases of the petroleum industry.

•

Tradewinds Exploration, Inc., has acquired Warren-Bradshaw Drilling

Lease Drive Starts On Georgia Coast

A group of Texans has started a leasing drive along the Georgia coast, near Savannah.

Roderick Stamey, a geologist representing the group, says leases are in the process of being signed on 20,000 acres as the first move toward possible leasing of some 500,000 acres.

No tests will be drilled in the near future, he said, since geological and geophysical studies must be made first.

Georgia, which has no production, has offered a $250,000 bonus for the first producer.

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To begin with, Magcobar technology itself is more than money can buy. It gives you an extra assurance of success. Magcobar technology allows you to take advantage of every cost cutting opportunity. It helps you to drill better, more profitable wells. But, more than that, Magcobar technology helps let you plan right from the start. The Magcobar **planned mud program** keeps the over-all cost of drilling down. And Magcobar can base this planning on its broad experience, the quality of its products, and the skill of its mud engineers. It's all to your advantage! Wherever in the world you are drilling, begin now to plan with Magcobar for your next wells. You can be confident of cutting high drilling costs and of a **well done** with Magcobar technology.

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Co. Division of Sunset International Petroleum Corp.

In return, Tradewinds gave Sunset more than $1-million of Tradewinds common stock. In addition, 7/10 of a share of Tradewinds stock was given for each share of Sunset held by stockholders of record Feb. 15. The acquisition gives Tradewinds a total of 26 drilling rigs.

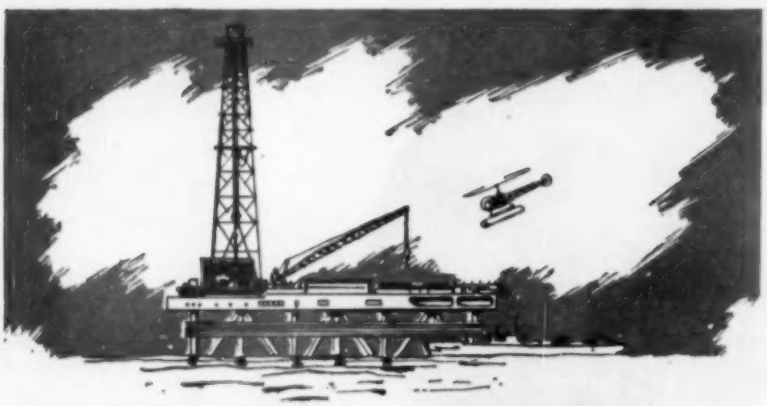
•

Engineering

General Electric Co. has come out with a light gas turbine engine that is adaptable to oilfield service.

Model 720/722 weighs 300 lb. and has a shaft horsepower of 900. It is being field-tested on a fracturing unit operated by Halliburton Oil Well Cementing Co., and on a gas compressor drive in a main-line pump station of Trunkline Gas Co.

The lightweight unit, which was built around the company's T58 turboshaft engine, gives operators the high power and speed flexibility required for pump operation, GE says, while permitting use of a smaller and lighter truck than is normally needed for this work.



LOSS PREVENTION SERVICE
an IMPORTANT part of
OFFSHORE OIL INSURANCE

YOUR INSURANCE AGENT or broker knows the importance of experienced handling in arranging proper coverage, and he knows how much proper servicing of losses can mean to you. For this reason he will probably recommend placing the insurance on your offshore oil drilling and production equipment with a specialized market such as Southern Marine which is located in the hub of the oil industry in the Western Hemisphere.

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Drilling Highlights

Wyoming—Sohio Petroleum Co. No. 1 Cow Creek Unit, section 12-16n-92w, Carbon County, a dual discovery, flowed 10,965,000 c/f of gas and 40 b/d of condensate through ¼-in. choke and perforations at 8,510-45 ft. in the Frontier and through 19/64-in. choke and perforations at 9,630-50 ft. in the Nugget (Jurassic). Separate gauges were not reported. The test is 7 mi. northwest of Deep Creek, where American Petroleum Corp. completed a small Mesaverde gas discovery in 1950.

In Natrona County, Davis Oil Co. No. 1 Federal-Burke, section 1-36n-79w, recovered 580 ft. of 35.4-gravity oil, 120 ft. of 50% mud-cut oil, 190 ft. of mud cut 10% with oil, and 60 ft. of muddy water cut 10% with oil, on 3-hour test of the Second Frontier at 6,010-35 ft. The prospect is 4 mi. south of Burke Ranch field, which produces from the Dakota.

North Texas—W. W. Higgs No. 1 E. H. Cunningham, block 1, Falls County school land survey, Wise County, flowed 160 b/d of 42-gravity oil through ½-in. choke and perforations at 5,966-80 ft. in the Caddo (Pennsylvanian). The discovery is 2½ mi. north of Sancree field.

West Texas—Texaco Inc. No. 1-DG State, section 27, block 3, University lands survey, Upton County, was completed for 253 b/d of 39.8-gravity oil through 40/64-in. choke and perforations at 7,274-89 ft. in the Spraberry (Permian). The opener is 2 mi. west of Flat Rock Spraberry field.

In Pecos County, Midwest Oil Corp. No. 1 University, section 6, block 20, University lands survey, recovered 3,400 ft. of 40-gravity oil and 200 ft. of heavily gas-cut mud on 2-hour test at 6,692-730 ft. in an unidentified formation which is believed to be the Ellenburger. The prospect is 1½ mi. south of South Girvin field.

Mississippi—Miss-La-Tex Gas Corp. and Fred Briscoe No. 1 USA, section 36-5n-1e, Franklin County, was completed as a Wilcox sand oil discovery, flowing 96 b/d of 39-gravity oil through perforations at 4,824-26 ft. The pool opener is 1½ mi. east-northeast of North Freewoods field and 2½ mi. southwest of Knoxville Tower.

Colorado—B. F. Allison No. 1 Pan American-State, section 33-3n-54w, Washington County, was completed for 4.2-million cf/d of gas through 24/64-in. choke and perforations at 4,781-83 ft. in the J sand.

COMPLETED AS A PRODUCER . . .
BELOW 20,000 FEET

Had this well been dry, it would merely be another statistic. Yet, it was completed as a producer.

To prove production possibilities on this deep Louisiana well, five Drill Stem Tests were run below the 20,000 ft. mark. In each instance, the packers were set below 20,000 feet, making these the deepest Drill Stem Tests ever recorded.

Testing conditions were most severe. Throughout each test, bottom hole temperature was 426°, mud weight ranged from 18.2 to 18.4, with a viscosity varying from 50 to 60. During the five deep tests, Johnston equipment encountered and recorded formation pressures as high as 19,365 psi and hydrostatic mud pressures up to 22,045 psi.

Packers and other equipment have previously been run and set below this depth; however, none in a Drill Stem Testing operation, nor under the conditions encountered in this well.

No misruns or equipment failures occurred. All equipment was retrieved intact. On two tests, equipment remained in the hole over twenty hours. Tests were performed in 7 inch—35 lb. casing through a 3/8 inch bottom hole choke. All were successful.

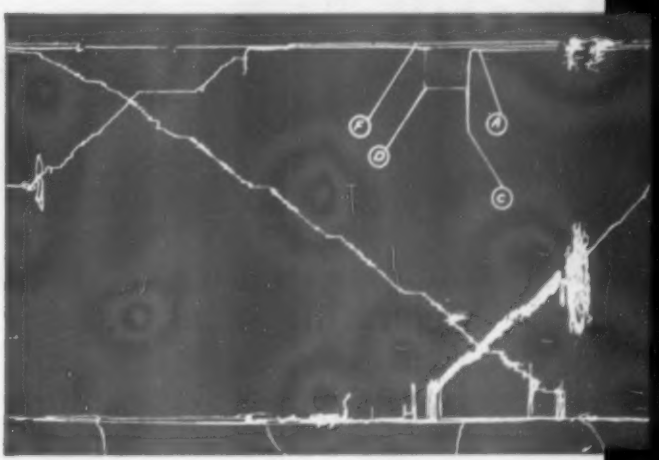
Drilling a well below 20,000 feet is a significant accomplishment, especially with the subsurface conditions peculiar to the Gulf Coast. The five Johnston Tests performed at this depth are also significant. They are testimony to the fact that Johnston can conduct Drill Stem Testing operations at extreme depths where high bottom-hole temperatures and extreme high pressures are encountered.

The drilling, testing and completion of this well is a prime example of the value of experience and planning, and proves the advisability of gathering all available information and data for evaluation prior to completing any well.

In any area . . . in any well . . . deep or shallow . . . high pressure or low pressure . . . before you set casing on your next well, call Johnston Testers. You get more from a Johnston test.

All tests were performed by Johnston Testers using the new Johnston testing tools.

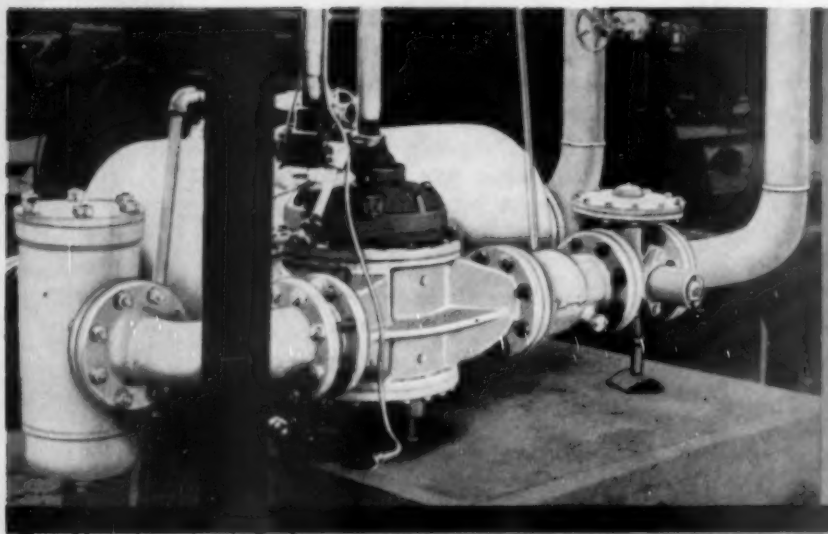
FINAL TEST
Packer set at 20,068'
Initial Hyd. Mud 19,960 psi
Initial Flow 15,435 psi
Final Flow 17,719 psi
Final Hyd. Mud 20,061 psi
Recovery Oil (39.5° Gravity) and Gas



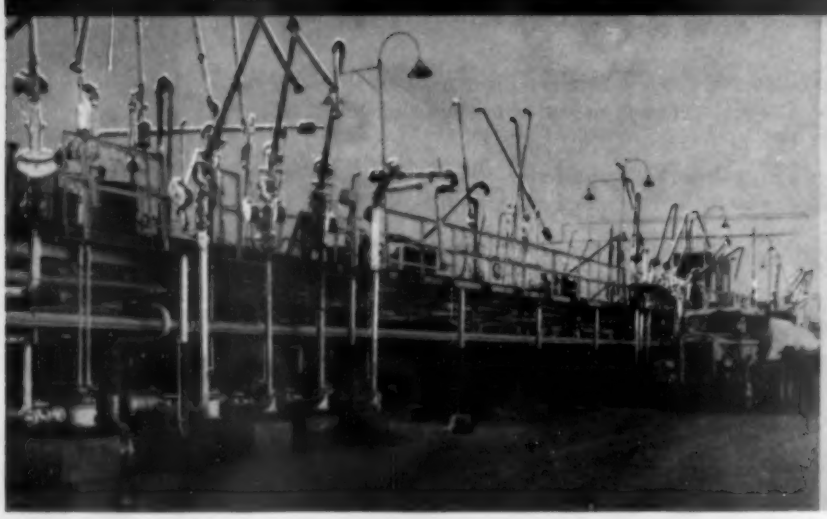
JOHNSTON TESTERS, INC.

P. O. Box 98 Houston 1, Texas

Continental Oil



SPECIAL PRODUCT LOADING
Three-inch S-35 Smith-Erie Meter assemblies equipped with temperature compensators, set stop valve, strainer, set stop mechanism and barrel counter. Printed meter ticket checks reading against refinery production.



LOADING TERMINAL
Approximately 30 Smith-Erie meters are in service loading products into trucks of Continental's customers, and tank cars for rail shipment. These meters are equipped with temperature compensators, deaerators, flow rate control valves, set stop mechanisms delivering gross gallons and printed tickets.

At Denver Terminal, separate Smith-Erie meter systems keep accurate accounting of all sales and transfers

Knowing the ins and outs and knowing them *exactly* is a must at complex product refinery-loading installations such as this one operated by the Continental Oil Company. Small wonder this progressive company "counts on" Smith-Erie meter systems for precise accounting of every drop of finished petroleum product regardless of operating conditions.

At Continental, knowing the ins and outs has a double meaning. Here, two separate operations go on simultaneously. One is intra-company distribution of the product from refinery to Continental trucks. The other is an out-sales situation involving transfer of product from refinery to trucks owned by Continental's customers. In both cases, Smith-Erie meters save costly manpower . . . provide for direct throughput . . . cut evaporation losses.

This Denver terminal is just one example of how Smith-Erie metering systems measure up to the most complex terminal requirements. For more information, contact your A. O. Smith meter man or write direct.

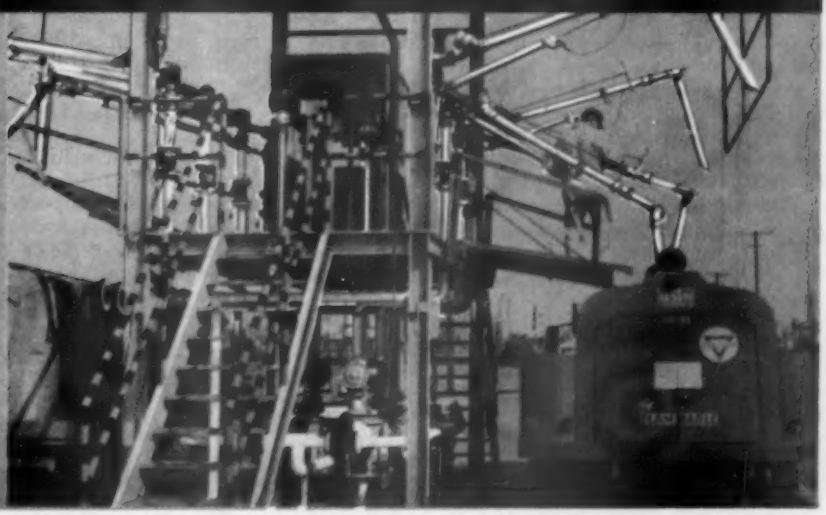
meters every drop

MARKETING STORAGE

Two Smith-Erie AS-35 and two AS-50 meter assemblies measure finished products from refinery production into tanks for Continental's own marketing division. Meters are equipped with temperature compensators, gross and net counters, set stop valves, deaerators and strainers. Readings are checked against refinery production and retail deliveries.

MARKETING DELIVERY

Four Smith-Erie AS-35 meters with accessories record loading of finished petroleum products into Continental trucks for delivery to Continental stations. This completes accurate record between manufacturing (refinery production) and deliveries against sales. Meters account for every drop and print a temperature-corrected record — automatically.



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Special Report
OFFSHORE OIL

- *The upcoming federal lease sale — largest ever — should be a solid indicator of what lies ahead for the revived offshore petroleum industry, particularly for drilling in very deep water.*
- *Heavy demand has created a temporary shortage of mobile platforms, due partly to expanded wildcatting.*
- *Work on underwater storage may begin this year. And intensified research is bringing closer the day of underwater completions.*

Offshore Operators Gear for Decade

The offshore petroleum industry is starting off the new decade with a firm though unspectacular swell of activity, which should provide a steady base for a solid expansion in the future.

Offshore operators are again showing some optimism, after climbing back slowly from the effects of the recent recession. The slack interval, however, has left its marks. Some operators and drilling contractors who had been quite active offshore have turned their efforts elsewhere. And so have many of the related enterprises that sprang up to serve the industry's needs during the rush days four and five years ago.

But the signs of revived effort are evident. Along the Harvey Canal, in Louisiana, a fabricating yard that had been all but completely bare a few months ago is now busy constructing platforms.

Drilling tenders which had been immobilized in the sluggish bayous are again back in service.

A new platform will soon appear off California.

And in at least one oil company research lab, plans are taking shape for something new in the way of offshore production methods.

Unless all the indicators are awry, 1960 should be a good year for offshore oil. All of the portents read the same way—a substantiallly better year, but nothing sensational.

More rigs already are at work. Drilling permits are up. And the fact that the upcoming federal offshore lease sale is being held (in the wake of Louisiana's sale this week) is in itself an expression of the advance interest shown by operators.

Company plans point to at least a slight increase in activity this year.

One major, which drilled 4 wildcats and 17 development wells during 1959, plans 7 wildcats and 30 development wells during 1960.

Another is figuring on a 5% to 10% boost in its activity.

A third, which drilled 13 wildcats and 116 development wells last year, had planned to drill only 5 wildcats and 86 development wells this year. But it has just revised its program upward; it now expects to drill as many holes as it did in 1959, perhaps more.

Drilling contractors, largely because of a recession-imposed thinning of the ranks, say their competitive position seems better than at any time in three years.

For offshore Louisiana, there should be an increase of somewhere between 5% and 10% in activity. One of the tipoffs is the number of drilling permits issued during the last month of 1959.

State regulatory authorities issued 80 drilling permits for offshore tests in December, almost double the 44 issued in the same month of 1958. While this is no surefire indicator, it is a rather strong sign of the increased activity to come.

"We believe that things have stabilized offshore now, and we are looking for a good year there," says one conservation official.

Another portent of what may be expected off Louisiana this year is the sharp rise in offshore production last year. Production of natural gas again led the way, percentage-wise, followed closely by production of casinghead gas.

Natural gas output last year from fields off the Louisiana coast totaled 251.6-billion cu. ft.—some 67.8-million cu. ft., or 36.8%, higher than in 1958.

The offshore production of casinghead gas went up to 68.2-billion cu. ft.—some 18-billion cu. ft., or 35.9%, greater than in 1958.

GAS PRODUCTION PLATFORM in Shell's Block 88 field, East Cameron Area, reflects the increasing pace of offshore activity.

# of Steady Growth, Big Changes

The output of crude and condensate didn't lag either; each increased by more than one-fourth.

The 1959 production of offshore crude was 69.6-million bbl.—about 14.4-million bbl., or 26.2%, above 1958.

Condensate production was 2.8-million bbl.—an increase of 563,000 bbl., or 25.3%.

Not only did the Louisiana offshore output increase substantially, but its ratio to onshore production also went up a couple of notches.

In 1958, the combined offshore production of crude and condensate amounted to 18.12% of the Louisiana total. In 1959, this percentage increased to 20.05%.

Offshore natural and casinghead gas production accounted for 9.94% of the state's total during 1958. Last year the offshore rate amounted to 11.96% of the state's over-all production.

Actually, all of the 1959 production figures are well on the conservative side. Because of the lag in the mechanics of reporting production, state statisticians estimate the production for the tag end of each year. Experience has shown these estimates to be usually very close. This year, however, the estimates have been shaved on the conservative side. So the final, actual totals will probably be greater —perhaps by as much as 5%.

Drilling-wise, the Louisiana offshore was slightly less active last year than the year before.

The Louisiana Dept. of Conservation reports only three offshore discoveries during the year—all gas. These were in Blocks 8 and 4, Eugene Island Area, and in Block 104, Vermilion Area.

There were 460 producers completed—395 oil and 65 gas. There were 96 dry holes, for an over-all total of 556 holes drilled.

This compares with the 613 holes drilled during 1958 —of which 393 were oil wells, 109 gas wells, and 111 dry holes.

And only 601 offshore drilling permits were issued during 1959, compared with 635 in 1958. (Some of the 1959 holes actually were begun in late 1958, but this is balanced off by the fact that some holes also were being drilled at the close of 1959.)

Off California, operators are continuing the more gradual process of feeling their way out across the steeper pitch of the Continental Shelf.

Offshore production hasn't yet tallied significantly. The older state leases (with some 600 producing wells slant-drilled from shore) averaged 42,307 b/d in 1959, a slight decline from the 43,128 b/d rate of 1958.

On the other hand, production was up from the newer leases, where operators still are developing tracts via the platform or man-made-island method.

Monterey Oil Co.'s island off Seal Beach, Orange County, produced an average of 2,903 b/d of oil and 2.7-million cf/d of gas from 31 wells in 1959.

Richfield Oil Corp.'s Rincon field island, Ventura County, had an output of about 1,650 b/d from 30 wells.

And the Standard Oil Co. of California platform in the Summerland offshore field, Santa Barabara County, accounted for about 1,000 b/d of crude and about 1-million cf/d of gas from five wells.

All told, the oil production rate from these tracts was up about 2,000 b/d over the previous year.

There were 31 holes drilled off the California coast last year—28 of them producers, including two discoveries.

The discoveries were on Parcel D (Cuarta Canyon-off-

continued ▸

shore) by Texaco Inc., and on Parcel C (Gaviota-offshore) by Stancal.

Texaco is expected to position a platform on Parcel D some time this year.

The outlook is for a 16% increase in offshore tests drilled off the West Coast this year.

A conservative prediction is that 36 holes will be drilled, five more than in 1959. In addition, there probably will be some stratigraphic tests drilled from fixed platforms and floating drilling platforms. There were 17 such tests during 1959.

Currently, three rigs are on offshore assignments—two at Summerland and one at Rincon. At least two more should be working some time during 1960, including Texaco's on Parcel D.

On the other hand, the prospect is more bleak than ever for activity off the Texas coast, following a substantial decline during 1959.

Only seven holes were drilled there last year—1 oil well, 2 gas wells, and 4 dry holes—most of them in waters near Corpus Christi.

This compares with 19 holes drilled during 1958—1 oil, 3 gas, and 15 dry—when activity centered principally in the High Island vicinity, near Galveston.

Perhaps even more indicative of the slump is the fact that 1959 production off Texas totaled only 575,820 bbl. of oil and a bit over 15-billion cu. ft. of gas—a drop in both categories from the 1958 figures of 580,587 bbl. of oil and about 16.3-million cu. ft. of gas. The drop in gas production is attributed to a reduction in the take by an industrial account.

The best available estimate for 1960 operations off Texas is "no better than 1959." The operators most likely to lead in any activity in this are reluctant to discuss any drilling programs.

"The pickings and the sands are both thin," says a spokesman for an operator who has done considerable exploratory work in the area, with little apparent success. "A lot of people are about to throw in the towel as far as Texas is concerned. Off Louisiana, they find 400-ft. sands while we're lucky to find 6 ft. of producing sands off Texas.

"And the funny thing is that the closer you get to Louisiana, the worse things get. At the Sabine River, the whole geological picture changes."

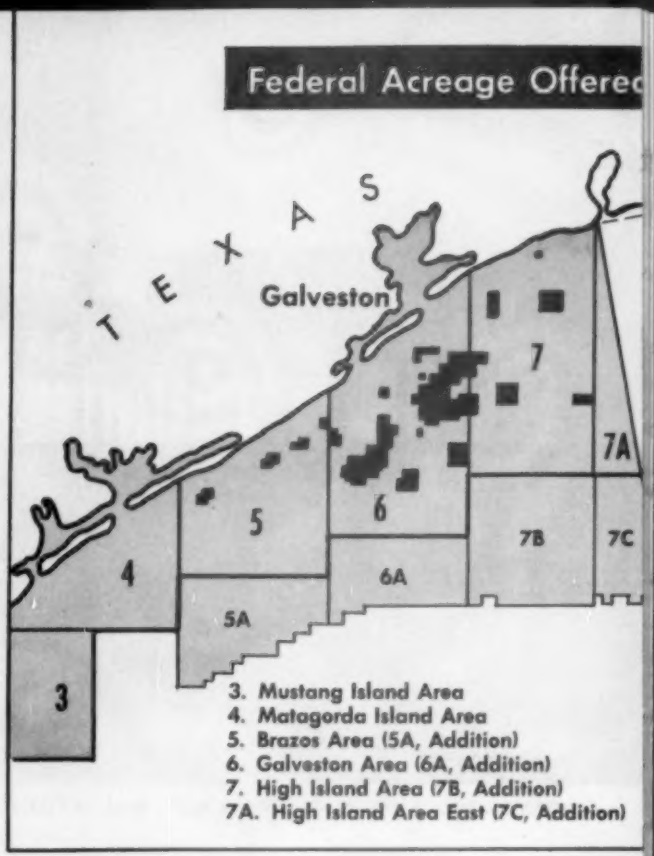
Watch Upcoming Lease Sale

In less than a week, the federal government will open sealed bids on about 1.6-million acres of submerged tracts off Louisiana and Texas. This is considerably more than the combined total acreage of all previous Gulf sales, and almost as much as the total acreage currently held under federal lease.

The bid opening in New Orleans Feb. 24 will involve 1,608,000 acres—a little more than 400,000 acres off Texas, and the remainder off Louisiana.

There were 272 Outer Continental Shelf leases issued in the five previous federal oil and gas tract sales. These include 23 leases covering 686,347 acres off Louisiana, 46 leases for 216,908 acres off Texas, and 23 leases for 132,480 acres off Florida, according to the U.S. Geological Survey, which administers OCS leases.

As of late 1959, this office adds, there were 422 OCS leases in effect, amounting to 1,642,451 acres. The lease total includes those leases originally issued by adjacent states and later validated by the U.S. The over-all total breaks down this way: Louisiana, 374 leases and 1,424,103 acres; Texas, 25 leases and 85,869 acres; and Florida, 23 leases and 132,480 acres.



Next week's bidding apparently will be lively, whether it stacks up money-wise with previous sales or not.

The large offering this year resulted, as is customary, from nominations by prospective purchasers; that is, the Bureau of Land Management had at least one request from an interested party for each tract it is putting up.

One of the prime motivating forces in the government's decision to go ahead with a sale this year, however, was the highly lucrative Louisiana state lease sale last year (PW—Feb.27'59,p8).

DRILLING TENDERS are in demand again. Here CATC's Jack Cleverley operates with Rowan Drilling's Rig No. 11.

1. West Cameron Area (1A, 1B Additions)
2. East Cameron Area (2A, Addition)
3. Vermilion Area (3B, Addition)
3A. South Marsh Island Area (3C, Addition)
4. Eugene Island Area (4A, Addition)
5. Ship Shoal Area (5A, Addition)
6. South Timbalier, South Pelto & Marchand Areas (6A, Addition)
7. Grand Isle Area (7A, Addition)
8. West Delta Area (8A, Addition)
9. South Pass Area (9A, Additions)
10. Main Pass & Breton Sound Areas (10A, Addition)
11. Chandeleur Area (11A, Addition)

The majority of more active operators are in pretty good shape on previously purchased acreage. Most of it has either been validated by production, or has been classed as a bad bet and turned back.

Operators seem to be in a buying mood. The general opinion is, however, that bids won't be exceptionally high, on the whole. Even so, some particularly desirable blocks may still command a good price.

In a federal sale, bidding is strictly on the basis of the highest cash bonus offer (with a minimum of $15 per acre). The 1/6 royalty rate and the $3-per-acre annual rental are fixed provisions.

In the last federal sale, Aug. 11, 1959, the high bidders put up $88,035,121 in bonuses, averaging a little better than $2,267 per acre for the 38,819 acres involved in the 19 tracts auctioned off the Louisiana coast.

The highest bid, both in total amount and on a per-acre basis, was made by Shell Oil Co. for a tract in the South Pass Area—$26,105,000, or just over $10,442 per acre.

The outcome of the sale won't be a direct gauge of probable offshore activity in the immediate future, but it can be an index of over-all interest in the province.

Operators aren't under the same pressure to test newly acquired Outer Continental Shelf leases as they are to drill recently purchased state tracts, because of the lower rentals applying to the federal blocks. Frequently, an operator will hold off validating an OCS lease until near the end of the five-year lease period.

So even if the sale is brisk, it won't necessarily presage a fast pickup in activity. A "good" sale, however, can certainly be interpreted as indicating continued high interest in offshore prospects, and vice-versa.

Some special features of the sale will be watched very closely. For example, this will be the first time since the start of the big federal-state squabble over submerged lands that acreage will be offered in the big South Marsh Island Area—the old State Lease 340.

This hugh tract, lying between the Vermilion and Eugene Island Areas, originally was acquired by Texaco from the state of Louisiana. After lengthy negotiations, complicated by litigation at one time, Texaco's state lease was recognized in part by the federal government. The portion of the lease in Zone 1—within 3 mi. of the coastline—is now considered a valid state lease, regardless of the outcome of the federal-state controversy. The portions in Zones 2 and 3 apparently are subject to the results of the pending court action.

The tracts being offered in the upcoming sale lie in Zone 4, which is considered to be clearly under federal jurisdiction.

Offshore development has been fairly intensive in the flanking Vermilion and Eugene Island Areas, resulting in the location of substantial reserves, particularly of gas. The bidding for tracts in the South Marsh Island Area, therefore, should be interesting, and may be relatively high.

Another of the interesting angles is that some of the tracts lie under 400 to 600 ft. of water.

At the moment, neither drilling nor production is economically feasible in such water depths—although there's no question that it could be done, one way or another. As one chief engineer says: "Give us enough money and we can tunnel out there." But that would fall short of being a practical, economic project.

Since each of these deepwater tracts was nominated by at least one prospective purchaser, bidding is expected. Experienced offshore observers see it this way: These tracts probably will serve as a vast open experimental laboratory, where the industry will try out the tools and methods devised to overcome the water-depth obstacle.

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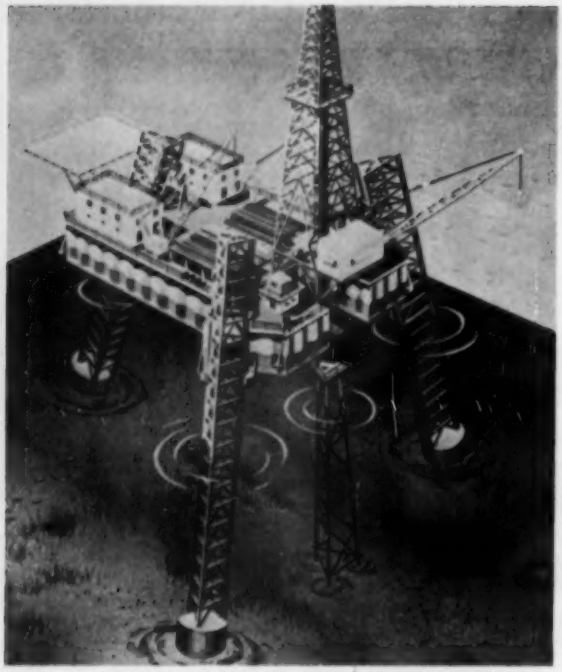

LeTOURNEAU-DESIGNED mobile rig has unique slant legs to provide greater stability in deep-water drilling.

CAISSON is erected first so that drilling can begin as soon as a mobile is moved into position, thus cutting costs.

New mobile platform designs, such as the recently announced R. G. LeTourneau slant-legged rig (picture, above, left), are likely to be developed and tested at these depths.

There is a good chance that even operators not actively engaged in this kind of research will bid for some of this acreage, on the theory that something may come along within five years to solve the depth problem.

What happens on these tracts may provide the key to successful operations in virtually any water depth on the Continental Shelf, opening up vast new areas to practical exploration. But this will be a slow development, with little very deep-water work expected for some time, perhaps several years.

The federal sale follows closely a much smaller sale of offshore leases by Louisiana. Texas is thinking of putting up some offshore blocks this year. But in California, the offshore lease situation is dormant.

Louisiana put up about 21,000 acres of offshore tracts this week. These are Block 1, a portion of Block 2, and Blocks 29, 30, 31, and 32 in the West Cameron Area, and a small parcel in the South Marsh Island Area.

Reports are that Texas has received some tentative nominations, and that the state is considering including some offshore acreage in a future sale of leases.

The California State Lands Commission reports it has received no requests for additional offshore land offerings, and has no leasing plans. Four operators have permits for coring operations off the coast, but only one, Stancal, actually is doing so. Shell has a geophysical permit covering offshore waters from Point Conception, Santa Barbara County, south to the Mexican border, but hasn't started any work.

Prices paid for offshore acreage in the past frequently have been so high as to make even an experienced landman shake his head in wonder. But some of these gambles haven't been bad ones.

It's true that some offshore leases, particularly those a long way from shore, will be a very long time paying out unless there is some change, such as a really big boost in demand and allowables, a hefty increase in the price of crude, or such like.

A gas discovery a great distance from land can put an operator in an even worse position. Crude, at least, can be barged in from such locations, but it takes a pipeline for gas production.

Yet some recent examples show that what appeared at the time to be an excessive price may not have been so bad after all.

Shell put up more than $32-million last August for a federal tract of 3,870 acres in the South Pass Area—an average of $8,490 per acre. The lease offsets Shell's South Pass Block 27 field, a very prolific oil and gas producer. Drilling has since confirmed an extension of the six producing formations found in Block 27 field, plus some additional shallow gas sands.

The California Co. paid $4.5-million in 1955 for a 2,500-acre lease in Block 86, South Timbalier Area. Late in 1959, this tract yielded a good gas-condensate discovery.

These are only a couple of the many examples of good strikes offshore, although they don't, by any means, prove that every lease will be productive, or that every lease that is productive will pay out.

continued ▶

When oil rigs probe the ocean floor ...why are Gardner-Denver pumps on board?

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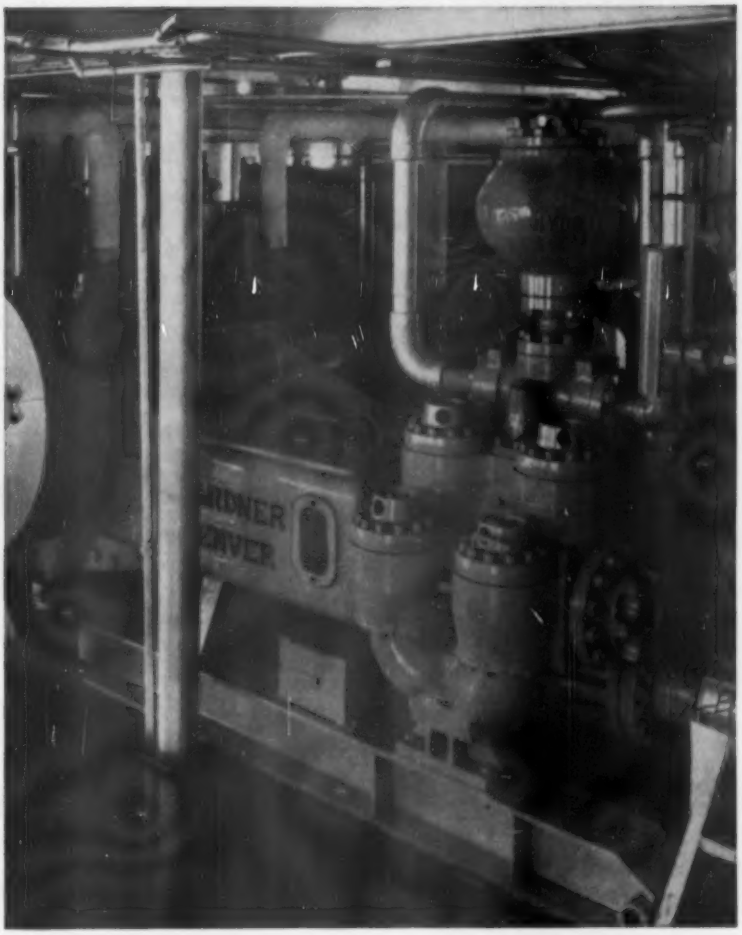

No one needs to worry about sudden pump failure when Gardner-Denver GX pumps handle the drilling mud. That's why most of the big offshore rigs carry Gardner-Denver pumps.

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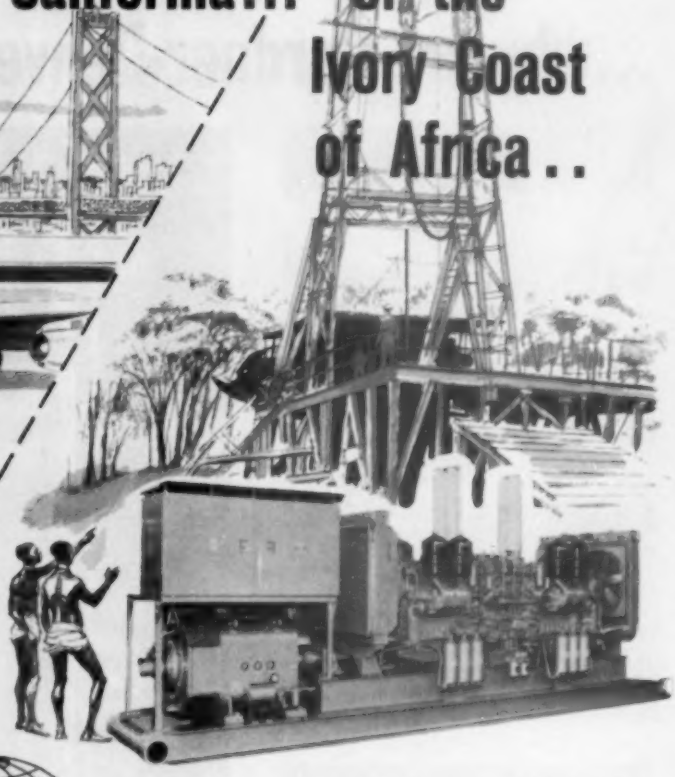

Stewart & Stevenson RIGELECTRIC engine electric power unit supplying power for drilling operations on Laughlin Porter's oil drilling rig in Africa.

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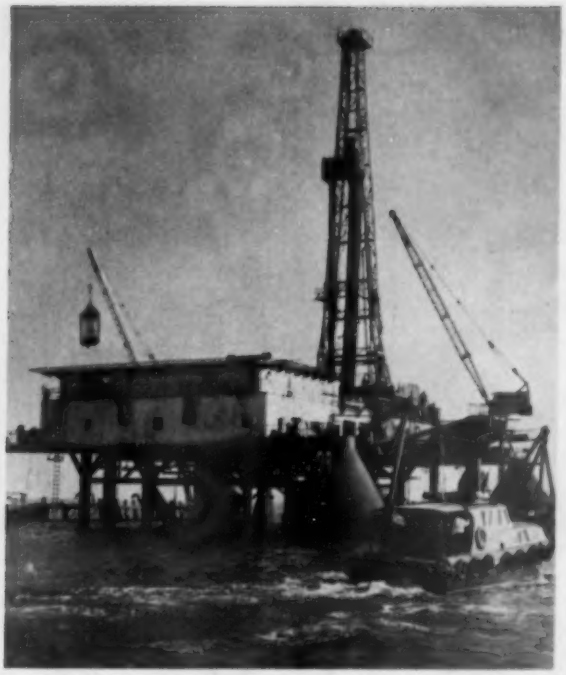


MOBILE platforms, such as this Louisiana-Delta unit operating in the South Pass Area, are currently in short supply.

WELLHEAD PLATFORM in Shell's Block 17 field, East Cameron Area, typifies the trend to more compact offshore structures.

Mobiles: On the Increase

The mobile offshore drilling platform has reached a new peak of popularity. This is one of the truly significant cues to the present nature of offshore operations.

During the early days of offshore work, drilling was conducted either from fixed platforms or from modified versions of the shallow-water inland marine drilling barges developed to conquer the marshes.

As drilling moved seaward into deeper waters, the drilling tender (at first, merely converted LST's) came into its own, in conjunction with small drilling platforms.

Then came the mobiles that could be towed to location, steadied by flooded underwater mats or long spuds lowered to the ocean floor, or both. After use for drilling, the mobiles could be refloated for work elsewhere. The mobiles became larger, more complex, more costly.

But several unexpected and unfortunate accidents—overturns, collapses of underpinning, and the like—plagued this class of drilling units.

The recession, which hit offshore work quicker and harder than most other producing areas, was tough on both mobiles and tenders.

Today, however, the situation has become considerably different.

There actually is at least a temporary shortage of mobiles for the demand. No mobile has been idle for lack of work in months, and most of them have jobs lined up for some time ahead.

The "Mr. Louie," for example, completed early last year (PW–Feb.20'59,p69), has been under contract continuously since it was acquired by Reading & Bates Offshore Drilling Co. last October. R&B says it has sufficient work lined up for the big mobile to keep it busy at least until late spring.

Barnwell Offshore's big "Mr. Cap" has been kept active throughout 1959 and is now under contract to the CATC group.

These are but some typical examples. Drilling at several locations, in fact, awaits availability of a mobile.

There are several reasons for the improved status of mobile drilling platforms.

Throughout the various phases of the offshore effort, the fixed platform was never out of the picture. It even appeared to be gaining more favor during 1957 and 1958.

In the deeper waters, however, the cost of fixed platforms is high. And unfortunate experiences with blowouts and fires evidently has tended to tip the scales against concentrating too many wellheads on one platform.

So the pendulum began to swing back toward the tender-platform and the mobile platform.

It is in exploratory work that the mobile excels. If the hole is dry, the mobile can easily be refloated and moved. The expense of an unnecessary platform and of lengthier rig-up and tear-down time, plus the cost of a derrick barge for both purposes, has been avoided. If the hole is a producer, the operator has his choice of using the mobile for development work or of moving in a platform for that purpose and sending the mobile to another wildcat location.

The day-rate cost for the mobile has decreased considerably—down to less than the rate formerly commanded by tenders.

Several mobiles are working abroad now. The effect of

continued ▸

this on their availability in the Gulf of Mexico isn't altogether clear, because some of the units were destined for foreign work when built, and others went abroad because the owners preferred term contracts, rather than the usual well-to-well arrangement here.

At any rate, according to an authoritative summary, as of the middle of January, 35 mobiles were either working in the Gulf of Mexico or enroute to location; 6 were on foreign assignments; 1 was undergoing postconstruction testing prior to service in the Gulf; 1 was in the construction planning stage; and only 1 was temporarily idle.

The trend has led to the emergence of more or less standard patterns in operation, and to techniques tailored for such patterns.

No two offshore operating companies will do the same thing the same way. There are differences representing management policy, individual company circumstances, and the like.

But the preferred general pattern now seems to call for use of a mobile drilling platform to drill the exploratory hole, then a shift to either a tender-platform or a fixed platform for development drilling.

An example of how techniques have been fitted to the pattern is the CATC procedure of erecting a caisson at a wildcat drilling location where the group plans on utilizing a mobile.

The caisson is 33 in. in diameter at the top, broadening to 6 ft. in diameter at the bottom. It is steam-hammered into the ocean floor to a penetration depth of 85 ft. It rises 33 ft. above water level.

A length of 30-in. conductor pipe is then hammered down through the caisson. Pending arrival of the mobile, the caisson is fitted with navigation lights and foghorn.

When the mobile arrives, it is simply moved over the caisson, and drilling through the conductor pipe commences.

This method avoids expensive delays in the mobile's spudding operation. If the hole is dry, the mobile moves off, and the caisson is salvaged. If the hole is a producer, a platform is installed, and the caisson assembly is tied right in with it (30-in. pipe, by itself, wouldn't be strong enough for the use as an integral part of a platform).

Drilling contractors also are watching developments in floating drilling concepts, in anticipation of the time when prospects beneath very deep water become the hunting ground.

The tender-platform method has proved feasible in waters more than 200 ft. deep (PW—Jul.10'59,p29). It probably can be pushed to 300 ft., and some think to as much as 400 ft. But there is an end point somewhere.

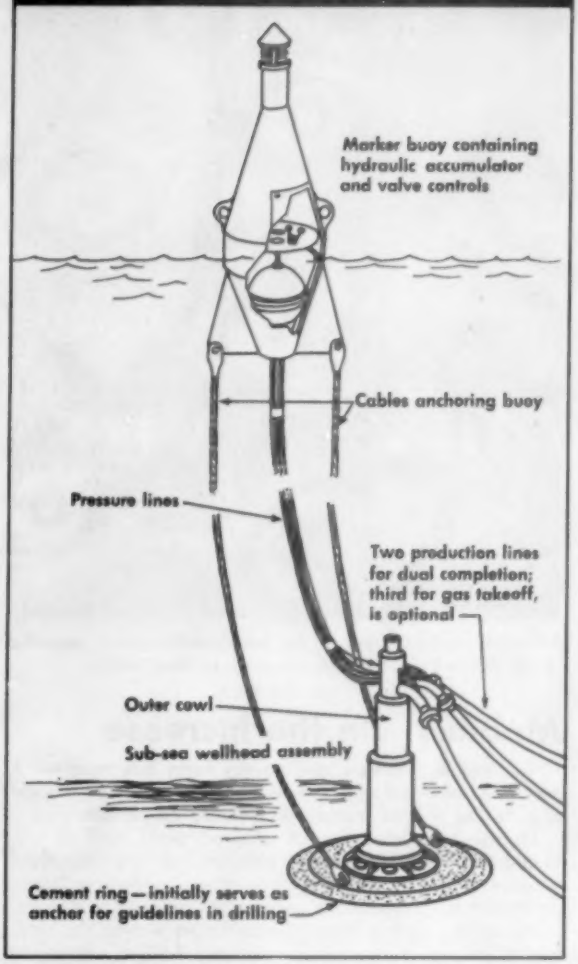
Some mobiles can operate in waters 150 ft. deep, though the new LeTourneau design is capable of going to 200 ft., and possibly deeper.

But beyond these depths, the floating drilling platform is about the only answer offshore experts can visualize right now.

"Everyone is forming his own opinion about what constitutes the best approach to deep-water drilling," says the president of one firm experienced in offshore contracting. "When the time comes to drill those waters, methods undoubtedly will be devised.

"It's primarily a monetary proposition right now. If some operator wants to push a deep-water project and is willing to foot the bill, I'm sure we could work out something to fit his pistol."

Proposed Sub-Sea Multistring Production Unit


Marker buoy containing hydraulic accumulator and valve controls
Cables anchoring buoy
Pressure lines
Two production lines for dual completion; third for gas takeoff, is optional
Outer cowl
Sub-sea wellhead assembly
Cement ring—initially serves as anchor for guidelines in drilling

ALREADY DESIGNED by Shaffer Tool Works, this multizone underwater completion unit is now in the prototype stage.

Goal: Underwater Completions

The underwater well completion still remains one of the most challenging and intriguing technological problems facing offshore operators.

The whole subject is more apt than not to bring a wry grimace from the men charged by their companies with making the offshore operation a success. Many of them aren't at all keen about it, very few of them are even optimistic—but most of them think it will have to be done sometime. The hope is that it will be less of a headache and considerably less expensive than it appears right now that it will be.

Nevertheless, despite the misgivings motivated by safety and economic considerations, it is apparent that it will be almost mandatory to find some way of setting the wellhead on the ocean floor at water depths where con-

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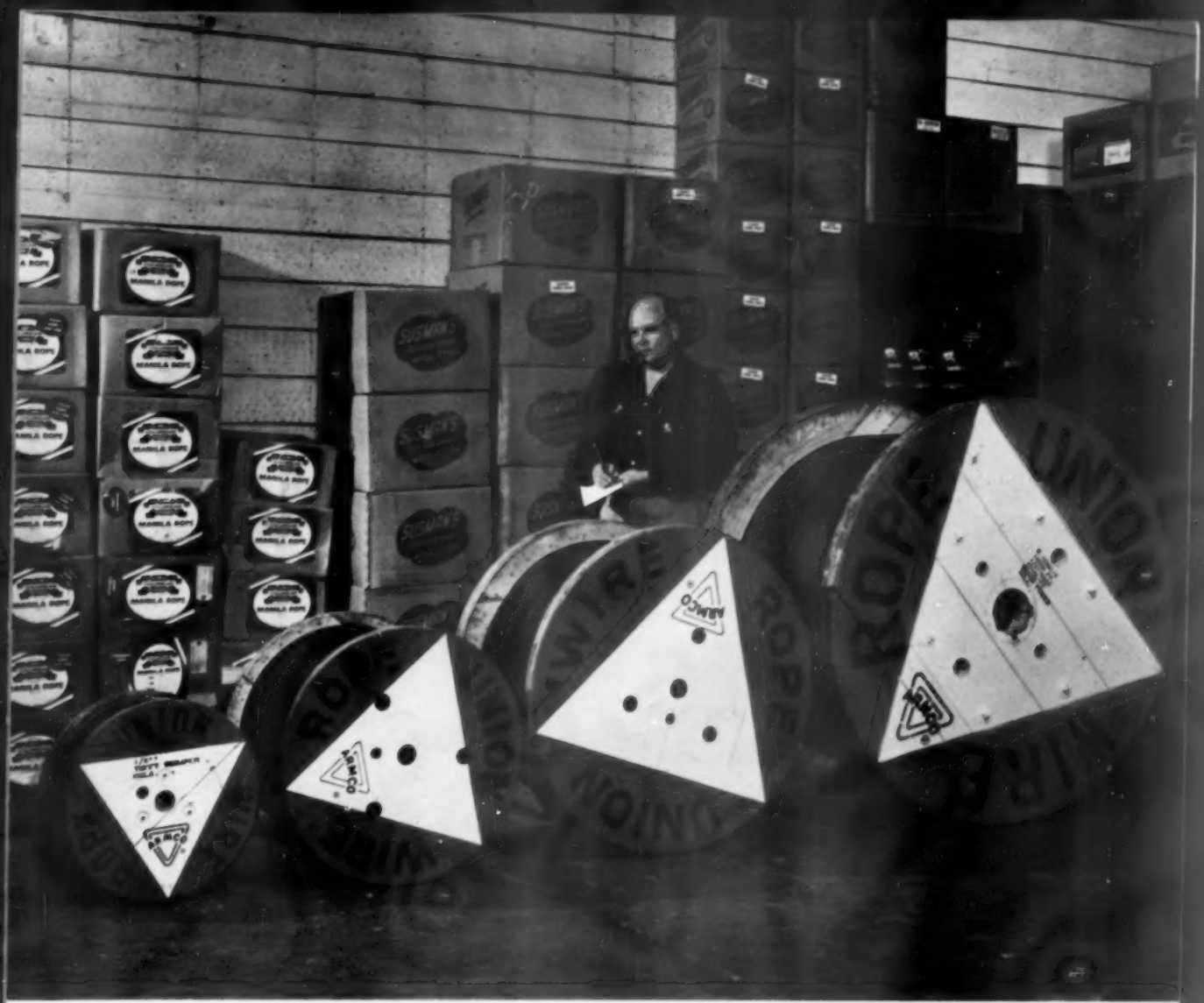

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More on the next page . . .

A National 80-B is checked during rig-up in our Houston Plant yard. Notice its compact arrangement. Suitable for medium depth drilling, the 80-B is rated at 1,000 horsepower.

The 80-B drawworks proves the speed and service life built into all National Rigs!

A rig you can count on—for drilling speed and efficiency, as well as long service life—is worth every dollar you invest in it. National Supply builds this type of rig, and you need only examine any one closely to prove its value. Take some of the features of National's 80-B, for example:

Unitized drawworks—Except for a detachable front base section for reducing width to the 8-ft. transportation limit, the 80-B drawworks remains intact and completely assembled. (Remember, this is a 1,000 horsepower rig for 8,000 to 12,000-ft. drilling!) Controls, catheads and auxiliary brake are undisturbed. The 80-B transmission is three-speed, with two drives forward to the drum shaft.

Centralized controls—Control design and arrangement are dictated by the convenience and safety needs for maximum speed of operation and drilling ease.

High strength drum shaft—Improved design drum shaft results in increased strength to shaft, better water circulation and better support and fit for spooling drum.

Large hoisting drum—25″ wide and 49″ long, it is exceptionally large for a rig of this size. You can handle 90-ft. stands of drill pipe without spooling more than three full layers of line.

Most efficient drum brake—The 80-B has a National Type K-46 Compound Equalizing Drum Brake—proved to be the best in the industry.

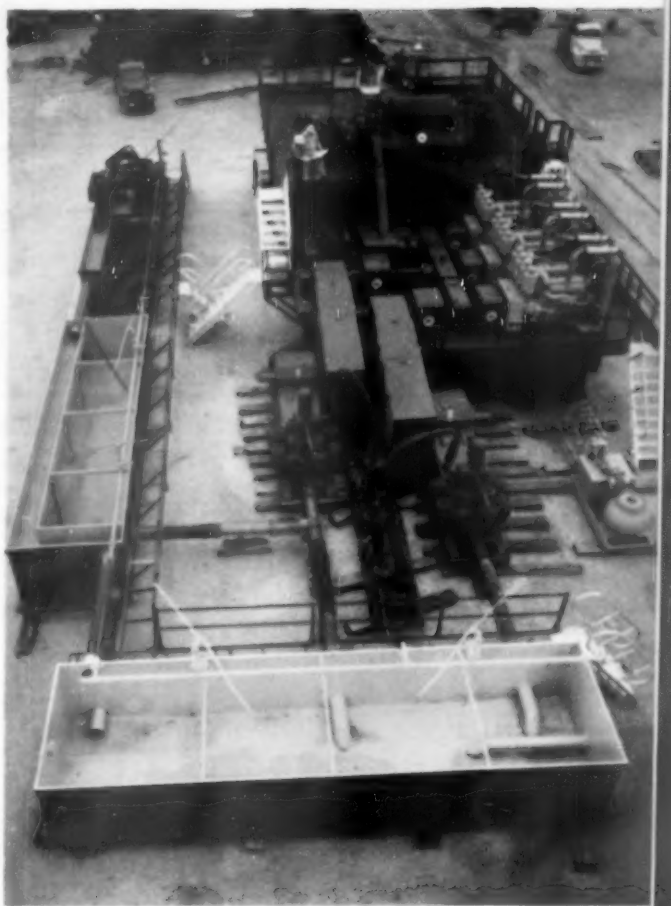
Air-cooled, operated clutches—Dy-A-Flex Clutches are mounted outside bearing supports for easy accessibility. Shoes are self-contained and do not require disassembly for lining replacement.

Heavy-duty catheads—National air actuated catheads are self contained, permit the driller to pull tonging or spinning lines with precise control.

Large core reel—Has a capacity of 12,500 feet of 9/16″ line. Nested arrangement of reel brake rim and clutch element permits a very compact design.

Other important features—Maximum convenience in all handling, control and routine operations including maintenance is further assured by: Unitized rope rollers, catline guides and sheaves; fully enclosed cascade lubrication for all chains, sprockets, mechanical clutches; all lubrication points plainly marked and easily accessible; air, oil and water pressure gauges in control cabinets; hand and foot throttles.

Take advantage of the compact rig design leadership you can see in National's 80-B drawworks—or any other National drawworks. Talk over your rig needs now with the National representative in your area.



Over-all view of the 80-B rig-up shows the three-section National Drive Group and two K-700 pumps.

More on the next page . . .

...and check these advantages of National Drive Groups!

Sectional Construction—A basic advantage pioneered by National, this insures unmatched and fast adaptability to various drilling and slush pump requirements. Drives are compact, factory pre-aligned, easy to move and rig-up.

Engine Compound Chain Enclosures—When the group sections are joined, chain is enclosed in a continuous, in-line case. Chain is cascade lubricated from a built-in oiling system. Chain enclosures can be quickly broken for moving or inspection, and have protective cover plates for moving and storage.

Power Transmission Arrangements—Engines may be furnished with National Hydraulic Couplings, National Torque Converters and air clutches.

Engine Adaptability—Pads or bases for mounting selected engines are integral in the frames. Any make of engine in oil field use may be installed.

Optional Pump Drives—These include: Drives for one, two, or three slush pumps; V-Belt or chain drives to the pumps; Single or two-speed pump drives.

National Dy-A-Flex Air Clutches—Outstanding for rugged performance, these clutches are furnished for pump drives and, on rig drive groups, in the master clutch position.

Air Operated Controls—Air piping for controls is installed in the frames at the factory, permitting control of all rig functions from the driller's panel. These include controls for: engine throttles and clutches, pump drive clutches, master clutch and inertia brake, and (when specified) fluid drive scoops. Upon request, extra control locations can be tailored for any requirement.

Complementary Equipment—Integrally mounted air compressor equipment for the rig control system is standard. Other drives for generators, dual air systems, etc. can be furnished to your specifications.

Complete Factory Testing—All National Drive Groups are assembled, lubricated and test run prior to shipment. Surfaces are protected by rust preventatives and all exposed surfaces are painted.

The National Representative in your area will be glad to give you more information on National Drive Groups, Drawworks, and related auxiliary equipment. Ask him soon.

This drive group section of the 80-B rig shown on previous pages includes a National Auxiliary Drawworks Drive. Mounted on a countershaft on the front engine frame, the Auxiliary Drive permits all engines to operate as a single power unit while drilling, affording flexible power distribution to all driven components as required.

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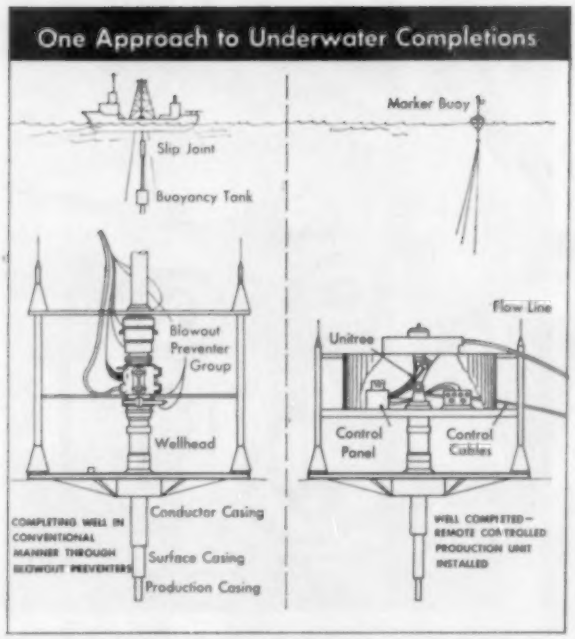

UNDERWATER COMPLETION system proposed by Oil Center Tool Co. has built-in safety features and remote controls.

ventional platforms are too expensive, or simply impossible to erect.

The stimulus for developing a standard, effective underwater completion system is growing stronger.

"It has to come," says a vice-president of one of the more active offshore operating companies. "We have spent a lot of money on it, and we think the results ultimately will benefit the industry."

It is true that a great deal of acreage in shallower Gulf of Mexico waters remains to be drilled, and that the only offshore fields profitable to any real degree, so far, are those lying relatively close-in to shore.

But if the operators are going to continue with offshore development, the day inevitably will come when they must conduct operations in the very deep waters, as evidenced by some of the tracts being offered in the federal lease sale next week.

Most of the operators are taking the realistic view that they must be ready with some kind of practical system for floating drilling and underwater completion.

The water-depth problem is more acute, of course, off the more-sharply-shelving California coast. "The people on the West Coast are showing a lot more interest in this right now than those on the Gulf," says a research engineer working on the problem for one supply and service company.

So, far, there hasn't been a true underwater well completion, and there isn't any strong likelihood that there will be one this year. But a great deal of the preliminary work has been done, and the remaining difficulties might be solved in the very near future.

Some of the necessary steps or phases for a completion have been successfully tested. And there has been some very recent experimental work in water depths to 60 ft.

At least one major offshore operator is planning tentatively this year to conduct a simulated underwater completion, with the wellhead actually above water. It wants particularly to work out some kind of special crossover tool to permit the periodic circulation of crude through the system in order to prevent sand-ups.

The operator also wants to try out a method of preventing the buildup of paraffin in the tubing, a common problem in the Gulf Coast.

But as of the moment, no workable system of an operational nature that will permit consistently reliable underwater well completions is available.

The basic requirements for equipment and methods to make underwater completions a standard operation have been pretty well outlined.

All of the functions involved in the conventional completion operation must be performed—the running and hanging of various casing strings, perforating, running and hanging tubing, installing the Christmas tree and flow-line connection, and so on.

But all of these must be done many feet beneath the water surface—in all probability beyond the depths at which divers can operate even for short periods—by remote control, and probably from the deck of a heaving and rocking floating platform.

Furthermore, the wellhead must be equipped that all production functions can be controlled remotely. There must be protection for the assembly against submarine hazards. And there must be some means of performing remedial work later.

Not the least important consideration for Gulf Coast soft-formation wells is the establishment of practical methods for dealing with expected production problems, such as sand bridging and paraffin buildup.

Some efforts are being made. Illustrative of the kind of thinking and planning going into the problem is the system devised by Oil Center Tool Co.

The whole subject still is rather touchy because of the very nature of preliminary work in any such endeavor, competitive considerations, and the like. But several supply and service companies are devoting considerable effort and expense to the search for a solution.

The OCT work is typical. The company's proposed method incorporates many features (drawing, left). These include:

- A guide system for orientation of drilling and production equipment.
- A remote-controlled connection for latching or unlatching drilling or production units.
- A device to compensate for the rise and fall of the floating drilling unit due to wave or tide action, and another device to compensate for drift of the drill unit.
- A buoyancy tank for extended drill nipple.
- A tube bundle to carry operating control lines.
- A means of hanging and locking in place tubing and casing hangers.
- Equipment for the latching and unlatching of production equipment under complete control so that it may be brought to the surface for repair and maintenance.
- A system for the remote operation of the production unit and for recording annulus pressure.
- Protection of the subsurface wellhead equipment.

continued ▸

"High-pressure flow lines are desirable, thus reducing the amount of remotely operated flow-control equipment on the ocean floor," says an OCT spokesman.

"The subsurface Christmas tree requires at least two power-operated and one safety valve to provide protection in the event of flow-line failure. During normal production operations, well control will be performed from the central gathering point.

"The outer housing for the Christmas tree and its automatic control equipment will not only afford protection from accidental dragging by anchor chains or the like, but also will be filled with oil or inert gas to keep corrosion at a minimum and prevent external marine growth about the production unit."

OCT believes the relatively small size of its Unitree makes it "very adaptable for underwater completion service" and reduces the size of the protective housing needed. The company's research project is aimed at providing a system operable in water depths to 600 ft.

Another company that has been active in this area is Shaffer Tool Works; it has designed and has in the prototype stage a multizone underwater well completion unit.

Shaffer previously had built a single-zone completion unit. The multizone type includes a production assembly to be placed on the ocean floor, with all working parts completely sealed in a waterproof cowl unit (drawing, page 48).

Pressure lines from the wellhead to a surface buoy would warn of any leakage beneath the surface. During remedial work, the cowl would be removed, with a service head connected directly to the workover rig at the surface.

Shaffer points out that, basically, the tools for subsea completion work are modifications of more or less standard tools generally available to the industry. In experimental use are such devices as landing base and guide systems, conductor heads, surface heads, submarine blowout preventers, and various types of pressure controls.

A company spokesman adds, however, that "on the shelf" items, such as valves, have to be modified or redesigned with the thought of underwater use definitely in mind. Such items must be examined from the standpoint of resistance to corrosion, lack of visual check after installation, and the like.

Shaffer points out that "economics is the key word" in any discussion of underwater well completions.

No matter how efficient or workable such a system may be, there is very little chance of its adoption unless it promises an economic return to the operator, one way or another.

But, when the economics dictate, equipment probably will be available that will work.

Underwater Storage Near

There is an excellent possibility that at least a start will be made this year toward construction of the first true underwater offshore storage facility. There is a chance, too, that one may actually be installed.

The placing of bulk storage below the water, instead of above it, especially in deeper waters, is so logical that most offshore operators accept it as a sure eventuality.

Many of the operators and service/supply companies have been working for years on various concepts to achieve it. As with nearly everything else offshore, the big problem is one of economics.

PRODUCTION STORAGE TANKS on the CATC platform are rectangular and "double-decked" for maximum use of space.

Bethlehem Steel Co.'s Shipbuilding Division reports that its design has attracted considerable attention from operators.

The company says interest has been most marked from operators with production in deeper waters, and relatively far from shore—those who feel most the pinch of high transportation costs.

Bethlehem's mobile facility essentially is a large rectangular tank resting on the sea floor, with four vertical towers rising to the surface from the corners (PW—Aug. 14'59,p78).

The units could be built to handle from 10,000 to 100,000 bbl. of oil, and could be used in water depths from 30 ft. to more than 100 ft. If desired, they could be refloated by emptying the tanks.

One of the latest designs for a mobile underwater offshore storage facility, drafted by J. Ray McDermott & Co., also is being discussed actively with several operators.

Pending a specific proposal, McDermott prefers not to discuss estimated cost of its unit (drawing, page 57). Industry sources familiar with the design, however, believe it can be installed for under $20 per bbl.

For conventional, above-water storage offshore, costs can easily run $50 to $60 per bbl., and can go higher. This is for facilities built from scratch, in fairly deep water, and some distance out.

(A production platform, without tankage, in water of around 100 ft. depth, can easily cost $500,000.)

Basically, the McDermott design incorporates several cylindrical tanks, fabricated into a single unit containing vertical and horizontal members.

Two of the steel tanks, 22 ft. in diameter and 110 ft.

continued ▸

ON BLOWOUT PREVENTER LINES–

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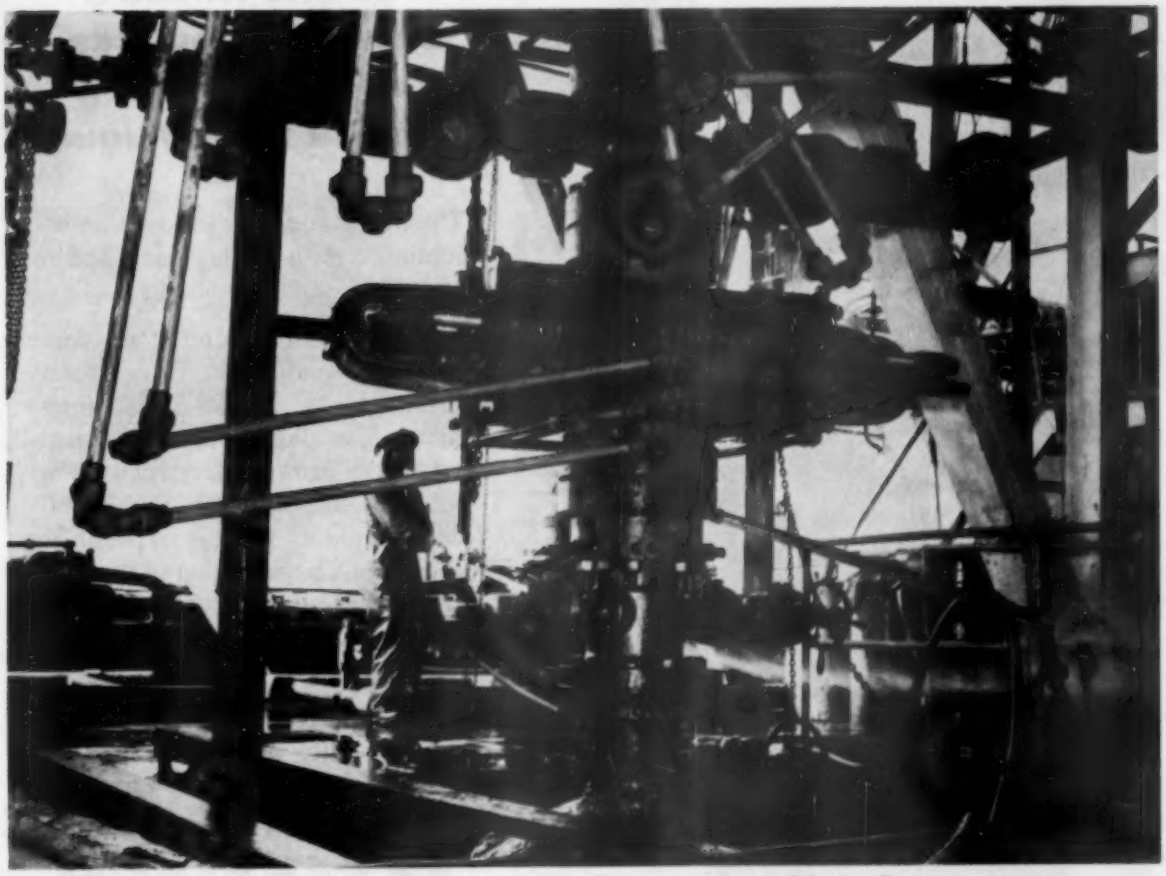

Chiksan Joints and Weco Unions on blowout preventer lines in offshore operations in Galveston Bay.

Convincing proof that Chiksan Swivel Joints measure up under severe conditions is shown in the following destruction test report: "In open flame trials, Chiksan Swivel Joints, under pressure of 1800 PSI, were subjected to flames reaching 650°F. The Swivel Joints functioned satisfactorily for a full 60 minutes—55 minutes longer than the time deemed necessary for the effective operation of the blowout preventer."

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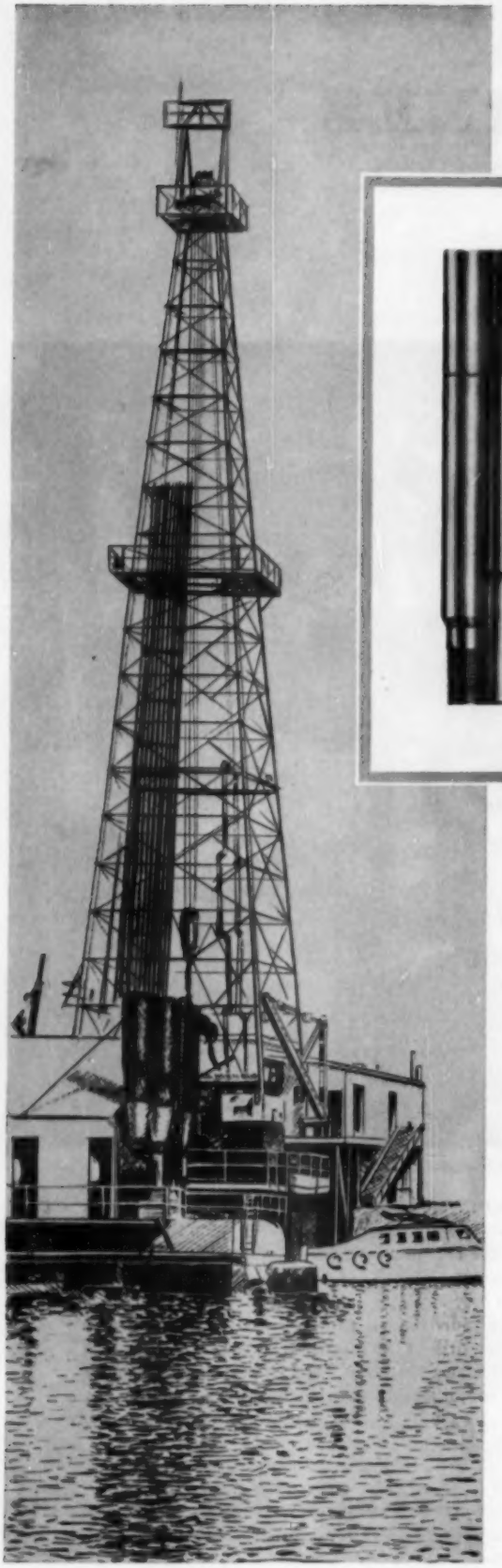

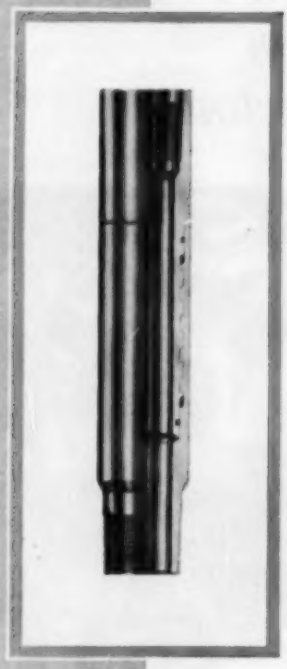

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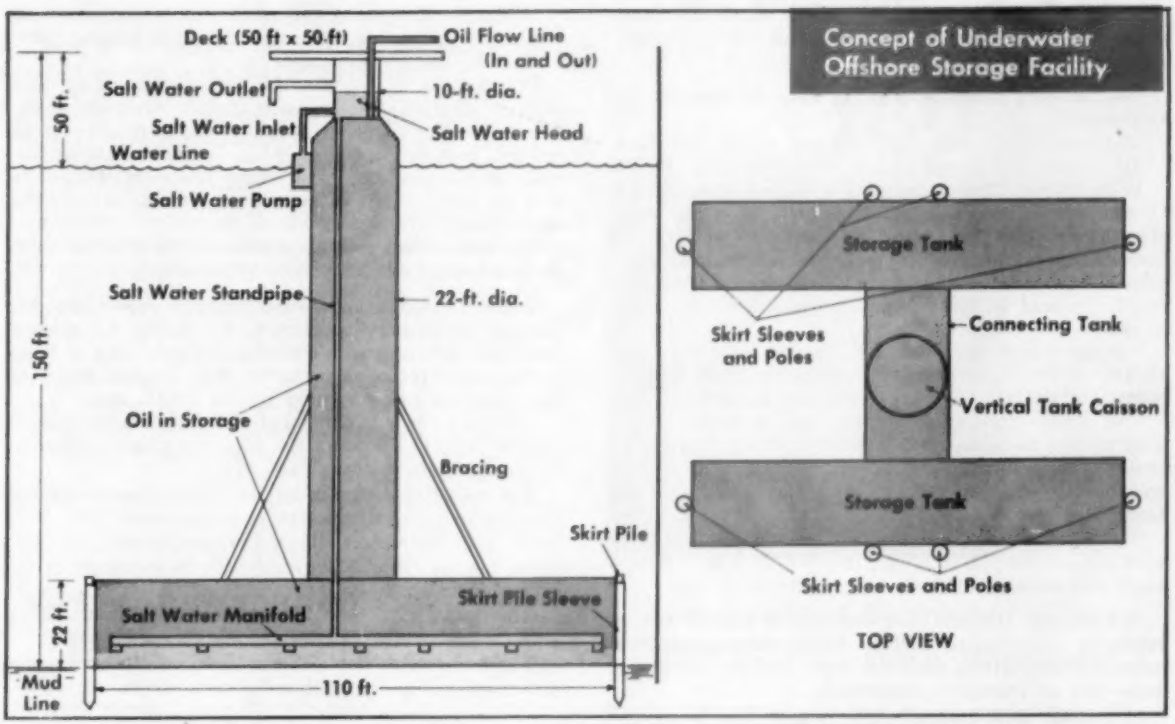

SALT WATER DISPLACEMENT is the key principle involved in this H-shaped system designed by J. Ray McDermott & Co.

long, are arranged parallel to each other on the horizontal plane, and connected by a shorter length of the same diameter, forming an "H." This part of the assembly would rest on the sea floor on location.

Another tank of the same diameter rises vertically from the center of the connecting tank. In effect, this vertical tank is a type of caisson. As with other members, it would serve as a storage tank and, at the same time, support a 50 x 50-ft. deck above the surface.

A short section of 10-ft.-diameter caisson is placed between the larger-diameter vertical caisson and the deck, and is a separate compartment within the structure.

In a unit designed for use in 100 ft. of water (with 50 ft. of clearance above the water level), the total storage capacity would be about 24,000 bbl.

The facility would operate on the principle of salt-water displacement.

The tanks would be filled with salt water by use of a pump. The water would be pumped into the 10-ft. section of caisson just under the deck, down through a standpipe, and out into the tanks through manifolds.

Incoming oil would flow into the top of the structure through a line which would empty it into the top of the vertical caisson. As additional oil is introduced, it would reverse the flow of the salt water, sending it up through the manifolds and standpipe and back into sea through an outlet located in the 10-ft. caisson section. The oil would thereby displace the salt water.

At some predetermined shutoff point (the oil would be metered in and out of storage), the oil inlet line would be closed.

The key to the discharge system is a salt-water "head" which would give the oil a starting push to begin the discharge cycle.

A salt-water accumulator tank, located in the 10-ft. section, would provide the equivalent of approximately 40 ft. of pressure head, says McDermott.

As the oil discharge line (the same line used for filling) opened, the head would start pushing the oil out at an estimated rate of some 4,000 bbl. per hour, McDermott figures.

Before the volumes of salt water and oil reached equilibrium, a vertical turbine pump would begin replacing the water in the accumulator tank, so that the head is maintained throughout the unloading operation.

Because the accumulator tank is open to the atmosphere (through the salt-water outlet), the salt-water system can't be over-pressured, says McDermott.

After discharging, the system would automatically shut down.

In effect, once the cycle has begun, the capacity of the turbine pump and the size of the flow lines are the only limitations on the discharge rate, the company adds.

Portability is one of the system's strong points.

The facility would be fabricated onshore and launched into the water, with the tanks and caisson towed as a single unit to location.

With the use of a derrick barge to provide the initial stability, the tanks would be flooded with sea water and sunk. The 10-ft. caisson section and deck would then be

continued ▸

mounted on the vertical tank. With only minor variations, the procedure would be reversed to refloat the facility and move it to another location.

The system's inherent stability also is stressed by McDermott.

McDermott calculates the structure would withstand 55-ft. waves and 125-mph. winds.

With the lower tanks flooded, the stability factor should be exceptionally good. In addition, however, eight 33-in. skirt sleeves are located at each end and on the sides of the bottom tanks. Through these would be driven 30-in. skirt piles to hold the structure firm against the buoyancy of the crude, the dead load of water, scouring, storm action, and so on.

For movement, the piles could be cut loose from the sleeves, or the sleeves cut loose themselves, with replacements put on before lowering at a new location.

"All loads—downward, vertical, and sidewise—would work against the piles," says a McDermott engineer. "The structure will always have internal pressure, because it will be full of fluid, to withstand compressive outside forces."

The system is a closed one, not open to the sea, and with the salt-water head always in sight, there would be a ready indication of any leaks beneath the water line.

The storage problem is a particularly critical one in relatively undeveloped offshore fields, where production volume is low. Lifting costs are high, and the per-barrel price tag on storage is important.

Where the distance-vs.-volume formula is in uneconomic balance for pipelining, the only solution is barging. That means the erection of storage.

Determining a representative lifting cost for offshore wells is difficult, because each specific situation is different. On the whole, it probably runs very close to $1 per bbl., including the 20¢-per-bbl. Louisiana state production tax. Oil produced from federal leases isn't subject to this tax, but a royalty differential amounts to virtually the same thing.

Naturally, under such circumstances, the operator wants to trim costs, and storage is a prime target.

While economic underwater storage moves steadily toward practicality, operators are trying to achieve maximum efficiency with orthodox methods. One of these is the use of rectangular, rather than circular, tanks, of the type now being erected by the CATC group.

This isn't a new development. But the work being done now by CATC illustrates the effort to achieve reduction in storage costs (picture, page 54).

The operating company for the group, Continental Oil Co., recently placed this type of storage on its "A" Platform, Ship Shoal Area, Block 199, and on its "A" Platform, Eugene Island Area, Block 208. Water depth in the area is more than 100 ft.

The tanks used actually are converted water tanks, originally fabricated for drilling purposes.

The tanks were "double-decked" on each other to gain additional use of the platform space available.

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Each tank is 32 x 44 x 7 ft. The platform deck is 110 x 52 ft. Four of the tanks were lifted to each platform—two of them placed on the deck with the long axis across the platform and the other two set over them.

The capacity of each tank is 1,750 bbl., so that the four of them combined provide 7,000 bbl. of storage.

Each of the facilities will be fitted with loading arms, so bad weather won't hinder loading work.

Two long booms will be constructed at each of the platforms, so that a barge need not approach closer than 50 to 75 ft. in rough weather.

"That way, we'll be able to unload the tanks even when the swells are bad," explains an engineer.

Another new wrinkle in underwater storage—the use of a submerged rubber tank—will be tried experimentally this year. A defense-inspired project, the approach could have an application in offshore oil work if successful.

The test will be conducted by a consulting engineering firm, working with a rubber manufacturing company, as part of a Navy project.

The prototype inflatable tank probably will be relatively small, with perhaps slightly over 1,250-bbl. capacity. The test will take place off Louisiana on a lease held by a major offshore oil operator and in waters between 50 and 60 ft. deep.

One engineer close to the project says: "We believe very solidly that this kind of unit will have applications within the offshore oil industry."

Safety, Automation Gain

Safety considerations are rating a higher place in offshore operations. This is showing up in several ways. One striking example is the "all-points" type of safety system recently installed on a CATC platform.

Production Systems, Inc., of Harvey, La., recently finished installing the safety system for CATC on a platform in Block 30, West Delta Area. The system is designed to shut down every operation on the structure in minimum time when conditions warrant (drawing, page 61).

The system's components are so arranged that alarm conditions would actuate safety devices at every point on the platform that could reasonably be termed a potential danger.

The pneumatic-type safety system is hooked into all wells and all major equipment on the platform, as well as the pipeline carrying production from the platform.

The platform serves 22 oil wells (most of them multiple completions). There are three separators on the platform —one for the high-pressure wells, another for low-pressure wells, and the third a test separator.

The closed safety system contains a supply of gas. Basically, it is activated when any of four types of conditions become abnormal—high liquid level, high pressure, low pressure, or heat.

Low pressure on any one well automatically shuts in all wells, on the assumption that low pressure means a broken flow line, which could increase the fire hazard.

High liquid level and high or low pressure at the separators also shuts in all wells. On the test vessel, however, malfunctioning due to these conditions merely diverts the flow back to the bulk separator. High or low pressure in the pipeline also would shut in the wells.

Located all through the system's gas-supply lines are literally hundreds of fusible plugs that will melt at temperatures exceeding about 160F. The melting of any one of these plugs would bleed the system down, causing all

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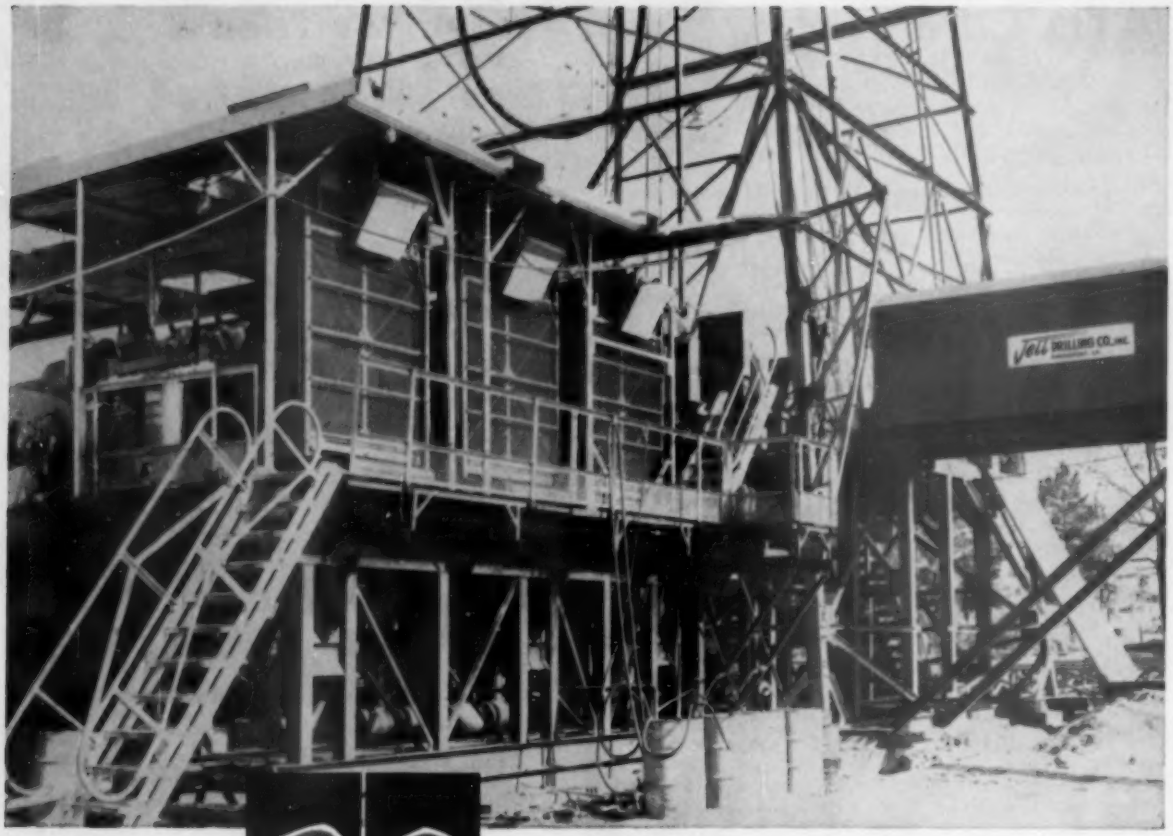

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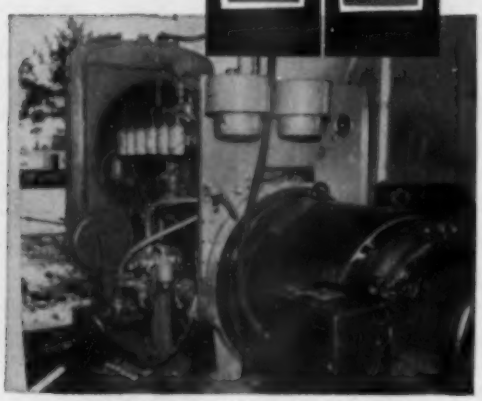

George H. Jett, of the Jett Drilling Co., Inc., Shreveport, La., relies on Waukesha power for his extensive drilling operations in Louisiana, Mississippi, and Alabama, because he's sold on Waukesha's rugged, dependable and economical long life engine operation.

Pictured above is the Jett Rig #114, powered by three Model VLROBU Waukesha Power Units, operating on natural gas. Inset shows a Waukesha "Long Life" Model 145-GZB gas unit, powering a 50 KW generating set, to supply electric power for the rig.

On nine other drilling rigs, Mr. Jett is using ten LRDBC (Diesel); six LRZB (gas); two LRORB (gas); and one NKDBSU (Diesel). With the skid arrangement and the same crankshaft center line heights on the LRDBC, LRZB, and LROR models, the Jett crews can easily change over from gas to Diesel operation in a few hours.

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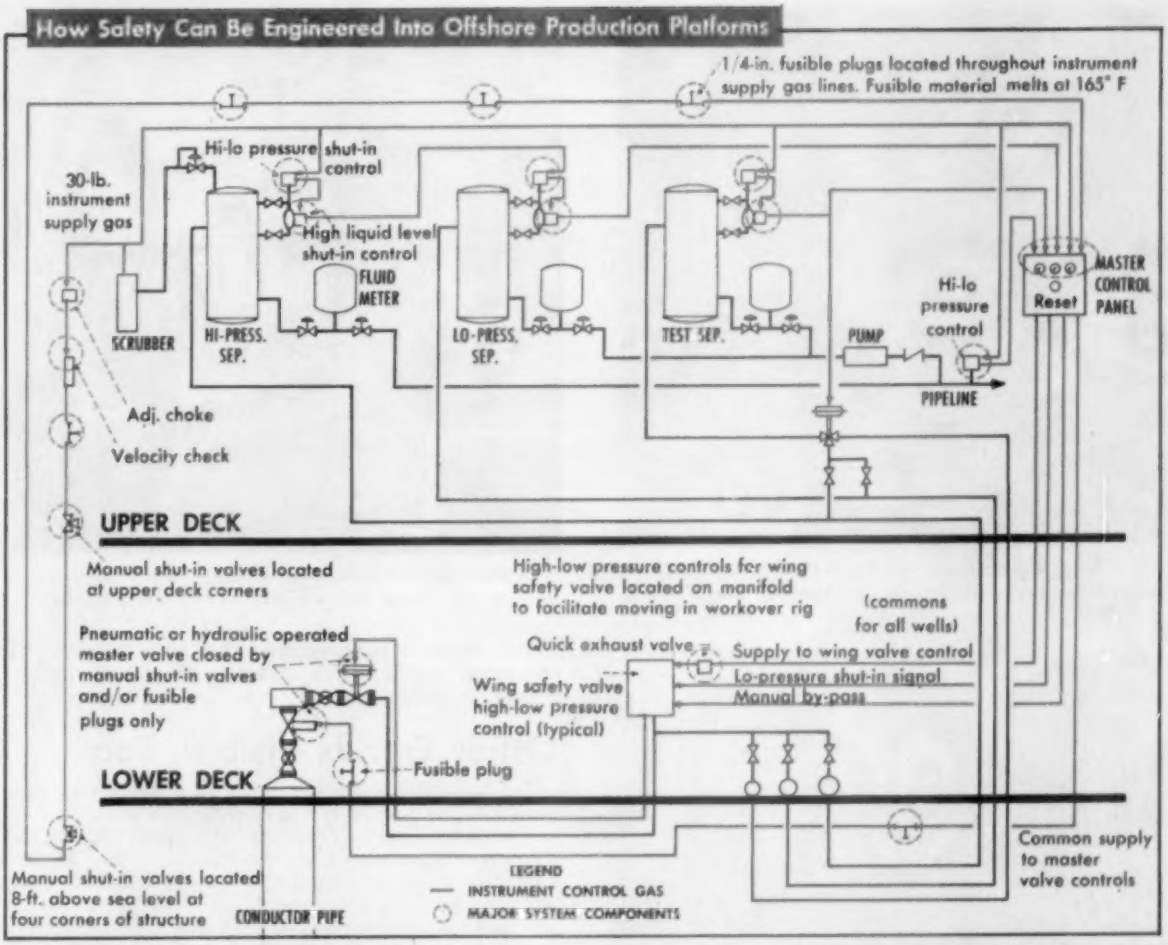
How Safety Can Be Engineered Into Offshore Production Platforms


1/4-in. fusible plugs located throughout instrument supply gas lines. Fusible material melts at 165° F
30-lb. instrument supply gas
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High liquid level shut-in control
FLUID METER
SCRUBBER
HI-PRESS. SEP.
LO-PRESS. SEP.
TEST SEP.
PUMP
Hi-lo pressure control
PIPELINE
MASTER CONTROL PANEL
Reset
Adj. choke
Velocity check
UPPER DECK
Manual shut-in valves located at upper deck corners
High-low pressure controls for wing safety valve located on manifold to facilitate moving in workover rig
(commons for all wells)
Quick exhaust valve
Supply to wing valve control
Lo-pressure shut-in signal
Manual by-pass
Pneumatic or hydraulic operated master valve closed by manual shut-in valves and/or fusible plugs only
Wing safety valve high-low pressure control (typical)
Fusible plug
LOWER DECK
Common supply to master valve controls
Manual shut-in valves located 8-ft. above sea level at four corners of structure
CONDUCTOR PIPE
LEGEND
INSTRUMENT CONTROL GAS
MAJOR SYSTEM COMPONENTS

PNEUMATIC SAFETY SYSTEM, developed by Production Systems, Inc., will automatically shut down wells if hazards develop.

wells to be shut in. These plugs are located on the deck, and around vessels, generators, and the like.

In the event of abnormal conditions detected by any part of the system, a master control panel receives a signal and blocks off the system's gas supply. This actuates diaphragm valves at each Christmas tree, or pilot valves on the separators.

The diaphragm valves are of the fail-safe variety, and are installed in a normally closed position so that it requires the system's gas pressure to keep them open. Loss of this system pressure causes the valves to close.

The panel automatically indicates the cause of the trouble, and where it occurred, and also whether an automatic or a manual valve has been shut.

The system contains other components as additional safety measures.

There are several manual shut-in valves, both on the deck and at the water level—a lesson learned during past blowouts and fires, when such a valve could have been operated from a boat had it been located within reach.

The system gives two warning signals—an outside horn actuated by escaping gas and another horn inside the platform living quarters, which sounds when a manual valve or a fusible plug causes a shut-in.

The offshore province also is a "natural" for the benefits of automation—provided the reliability factor can outmatch the admittedly rugged conditions encountered. One of the latest systems designed for offshore work is now being installed on a Gulf Oil Corp. platform off Texas.

The structure, located some 3½ mi. from shore in Block 889, Mustang Island Area, handles production from three gas wells (picture, page 65).

The system was designed to Gulf specifications by Texas Instruments Inc., of Houston. TI is handling the project, including installation, on a turnkey basis.

The system will permit remote control of production facilities on the platform from a console on Mustang Island, and the transmission of production data from the structure to shore.

The electronic supervisory system also will monitor the performance of various safety devices on the unit.

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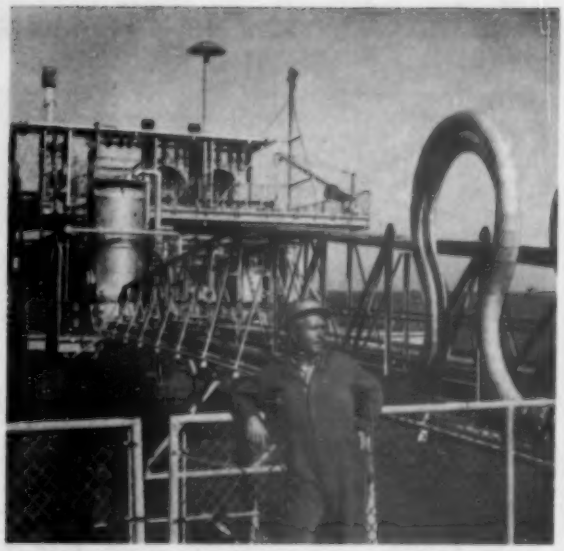
RIG DAMAGE from fire on Salt Dome Production's Rig No. 10 last year has since been repaired by Avondale Marine Ways.



GAS PRODUCTION continues its steep climb offshore. Lease foreman Jake Giroir checks operations on Shell platform.

HELICOPTERS have become virtually standard operating procedure in offshore work, particularly for distant platforms.

The electronic instrumentation has been designed and engineered with the idea of licking the tough environmental conditions encountered in the Gulf of Mexico.

Other Trends Visible, Too

The helicopter, never a stranger to offshore work, is a more integral part of the operations than ever.

The farther out the location, the more valuable the "chopper." Crewboat time, for example, from Morgan City, La., to one lease some 85 mi. away is between eight and nine hours; by helicopter, it is an hour or so.

This time-saving is particularly valuable in the dispatching of emergency parts, the knitting together of supervisory tasks, and the like.

The growth of one firm specializing in helicopter service during the past three years is a direct reflection of this fact.

Petroleum Helicopters, Inc., of Lafayette, La., currently has 52 helicopters of various types, plus some fixed-wing craft, here and abroad, making it one of the largest of such organizations. The majority of the firm's domestically based helicopters—Bells and Sikorsky S-55s and S-58s—are in offshore service. The growth of helicopter use is shown by the fact that Petroleum Helicopters was flying 16 helicopters, domestically, in 1957; 27 in 1958, and 33 now.

Another footnote to current offshore conditions is the fact that at least some drilling now is on a footage, rather than day rate, basis.

This isn't universal, by any means. But one large operating company reports that virtually all of its tests, except wildcats, have been drilled on a footage basis for more than a year.

Some offshore drilling contractors attribute any examples of footage contracting to the effects of the recession.

continued ▸

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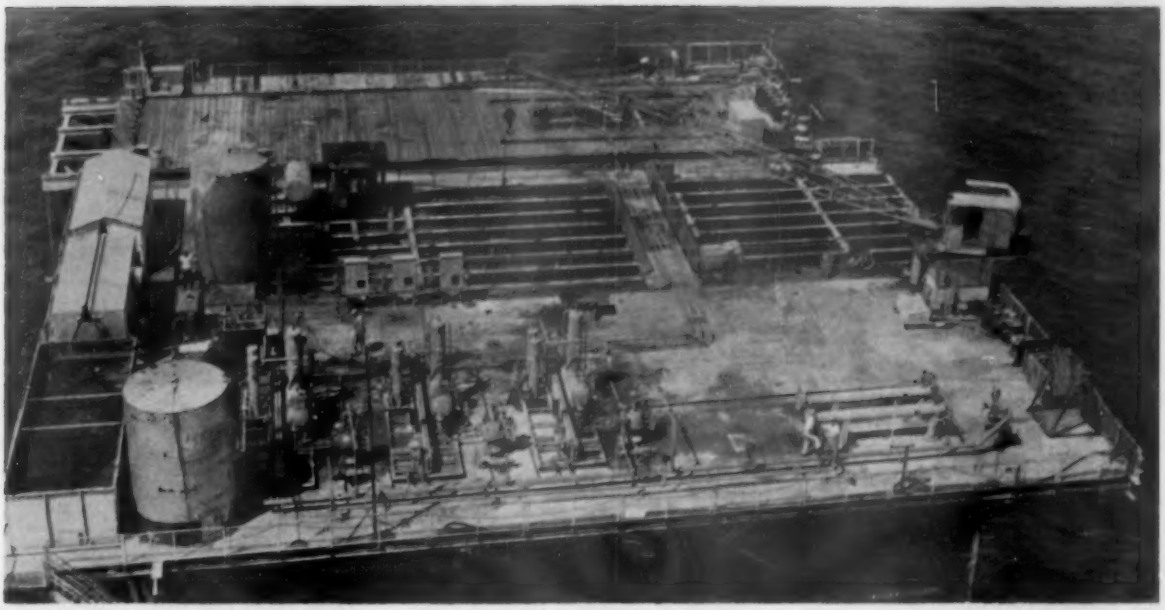

AUTOMATIC PRODUCTION CONTROL system is being installed on this platform in Block 889, off Texas Coast, by Gulf Oil Corp.

There is a wide variance in contracting arrangements. Wildcats or outposts are day-rate wells, in any case. But in some instances, where the contractor has had considerable experience in an area, he may take a footage contract on development tests, or take footage to a certain depth.

Some contractors like the footage route. "We feel the footage rates give us more flexibility," says one. "What it all boils down to, of course, is that by assuming the risks, we have been able to increase our margin of profit slightly. Of course, if all doesn't go well, we lose our shirts."

While the matter of offshore allowables off Louisiana still rankles operators, there doesn't seem to be any chance of a change this year, at least. But one recent regulatory change has helped some operators to offset most of the effects of bad weather.

Offshore operators still express "utter surprise" over the failure to equalize greater submerged-land costs by a higher differential in allowables.

But a highly placed regulatory official told PETROLEUM WEEK, "I wouldn't say that something couldn't come up to change it, but as of now there are no indications that anything will be done this year to change offshore allowables."

On the other side of the fence, inland operators say that onshore wells have had to take the brunt of slack times. There isn't any question that any move to change the differential would meet strong opposition from this quarter.

The Louisiana Dept. of Conservation last September issued an order stretching out the period during which offshore production lost "due to conditions peculiar to offshore operations" (ordinarily, production lost because of bad weather) could be made up.

Previously, the make-up period was only one month, and production for any given well could not go more than 25% above the daily allowable. Now the operator has at least a three-month make-up period, and production for any one well can go to as much as 50% above the daily allowable.

There were some points in the order that are still unclear, and it is in the process of being redrafted. The new, longer make-up period, and permissible per-well production rate, however, will be retained.

REPRINTS AVAILABLE

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PLASTIC PIPES designed to replace metal undergo gasoline-flame test, and . . .

PLASTIC GRID replaces wood in cooling tower, as . . .

More Plastics Displace Wood, Metals

By using new types of petro-chemical-derived plastics that have recently become commercially available, manufacturers in ever-increasing numbers, realize that they can replace metals and wood in the making of products and equipment exposed to corrosion and decay.

This was evidenced at the recent annual meeting of the Reinforced Plastics Division of the Society of the Plastics Industry, in Chicago.

The cost per pound of metals, such as zinc or aluminum, is substantially lower than the cost of most plastics. But metal-finishing operations are generally much costlier than the simple molding of a plastic, in quantity lots; thus, the costs of the finished products usually come out even, or there may even be a slight margin in favor of the plastic.

Substitution of plastics for metal or wood is of particular interest in the petroleum industry. For example steel piping can, in many cases, be replaced by glass-reinforced plastic pipe with a special lining.

This type of pipe was discussed at the SPI meeting by M. M. Levy and B. M. Vanderbilt, of Esso Research & Engineering Co. It consists essentially of a glass-fiber-reinforced resin pipe, which can be fabricated in several ways. Glass filaments can be dipped in the resin and wound around a mandrel; or the filament can be wound dry around the mandrel, and then impregnated by resin dispersed by centrifugal force, within a cylindrical enclosure. Glass cloth can also be used, although indications are that it is unnecessarily heavier than filaments.

The resins can be an epoxy—such as Shell Chemical Co.'s Epon 828—or a polyester—such as Atlac 382, made by Atlas Powder Co.—or a polybutadiene resin—such as Esso's Buton (PW—Nov.6'59,p90).

The liner can be a combination of polyvinyl chloride and butadiene-acrylonitrile rubber, with stabilizers, carbon black, and a vulcanizing agent. When the pipe is made by the centrifuge process, the liner can be obtained by adding a thin layer of the resin beyond the quantity needed to imbed the filaments.

The liner is desirable for several reasons, Esso says:

- It protects the glass reinforcement against wear;
- It reduces the formation of deposits by making a smooth internal surface;
- It is impervious, and prevents "weeping" through the pipe at high pressures.

Sometimes an external finish is applied to these pipes to improve their appearance.

These reinforced plastic pipes call for specially designed couplings.

Threads are not practical with pipes over 4 in. in diameter. And even with small-diameter pipes, threads are found to be weak, according to Esso. Adhesive couplings—for example with Buton-styrene or Buton-vinyl toluene resins—are restricted to low-pressure service.

A design developed in cooperation with Spiral-Glass Pipe Co., of Old Bridge, N. J., promises fast and effective joining of pipe sections of any size, Esso says. Basically, the joint consists of a male and female collar on the pipe ends, which mate to leave an open circular space for an O-ring seal. Then a split-ring forms a housing to enclose the two collars.

Fire hazard, one of the main objections against the use of plastic pipe in refineries, appears to have been greatly reduced with this glass-reinforced pipe.

The Esso engineers said that the pipe had been subjected to an intense gasoline flame for 15 minutes, both when filled with water under pressure and when empty, and survived (picture, above).

Most refiners consulted on the subject of temperature limitations, however, set a maximum of 180F as acceptable, at present, for these reinforced plastic pipes.

Food Machinery & Chemical Corp. expects to produce in commercial quantities by the end of 1960 an entirely new type of epoxy resins called "Oxirons."

These are epoxidized polyolefins, rather than the usual combinations of a phenolic product with epichlorohydrin. Oxirons can be cured, says FMC, with a much wider variety of catalysts than can conventional epoxies. And, while the epoxies have their characteristic triangles of carbon and oxygen (PW—Nov.20'59,p36) at both ends of their molecules, Oxirons may have these triangles right in the body of the molecule, or even in side-chains. This broadens greatly the number of uses to which these new epoxies can be put, FMC says.

The Oxirons are made out of in-

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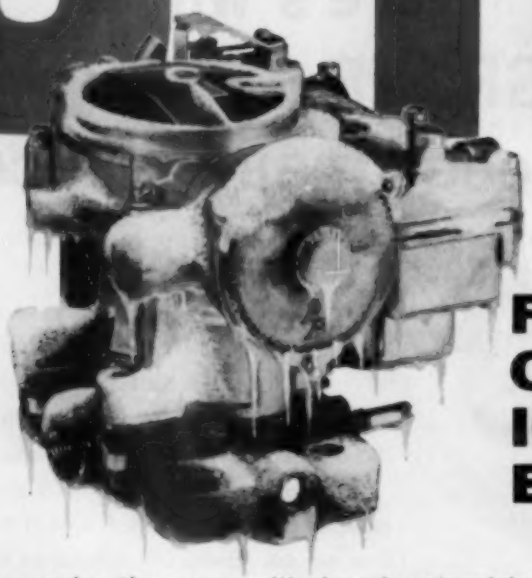

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CHEMURGIC RESEARCH *for* Industry

PLASTIC LINING and plug, of Hercules Powder's Penton, in a 2-in. Y-valve shows no sign of wear after 33 months of continuous service conditions that have badly corroded surrounding metal.

expensive refinery products, such as butadiene, or mixtures of olefins. They can readily be reinforced with adequate fillers, such as glass fibers.

To make these epoxies, the Becco division of FMC recently patented a new process whereby peracetic acid is produced continuously from acetic acid and hydrogen peroxide, over a resin catalyst. The peracetic acid reacts on the olefins to make the epoxy.

For applications where corrosion is a factor, but neither internal pressure nor heat enters the picture, the new linear polyethylene pipe is making headway.

Heretofore, polyvinyl chloride has led the field, among the plastic materials used for piping formerly made of metals. Its excellent corrosion resistance, both externally and internally, was its main advantage. It pioneered the field for plastic piping.

States such as California, Illinois, Kentucky, Maine, Wisconsin, and others, have either revised their plumbing codes or are presently revising them to provide for the inclusion of plastic pipe in suitable applications, in accordance with the pressure-temperature recommendations of the manufacturers, according to SPI.

Now Phillips Chemical Co., with its plastic pipe made of Marlex TR-212, is entering the field. This polyethylene pipe, Phillips says, is the most economical when used in installations conforming to SPI standards. It exceeds the requirements of the Dept. of Commerce, the U.S. Bureau of Standards, and the National Sanitation Foundation, for potable water use. Because of its light weight and flexibility, it can be supplied in coils.

Refiners, in general, have approved the use of plastic pipes, of the PVC or polyethylene types, for temperatures up to 140F and for low pressures.

Such pipes have been used extensively, in this country and abroad, to carry such products as fresh and salt water, acids, alkalis, halogens, detergents, SO_2-water, kerosine, and raw petroleum products, and also as electrical ducts, and for low-temperature vapors.

Recent production in commercial quantities of Du Pont's acetal resin "Delrin" makes possible the economical molding of plastic parts heretofore made out of zinc or aluminum, the company says.

Delrin's great tensile strength, rigidity, and resistance to creep and to solvents, at temperatures up to about 170F, makes this polymer of formaldehyde a satisfactory substitute for metals, Du Pont says. It is being used mostly in plumbing applications, parts for belt conveyors, automotive equipment parts, and threaded pipe plugs.

And Hercules Powder Co.'s new chlorinated polyether plastic, "Penton," until recently used in protective anticorrosion coatings, is now being molded into mechanical parts.

It has gone through five years of development, Hercules points out, and can be used particularly well at temperatures from 220F to 250F.

Penton is substantially lower in cost than high-priced metals and alloys for corrosion-resistant applications, Hercules claims, and is even lower than many conventional materials, now that it will be produced in a large-scale commercial plant.

U.S. Industrial Chemicals Co. is now introducing in the U.S. its "Merothene," which is a finely divided polyethylene, of a type already being used in Europe.

Unlike conventional polyethylene, this powder can be dispersed in water or alcohol, then melted to form a strong, corrosion-resistant coating. Or it can be melted and molded into larger objects previously made out of other materials.

Substitution of plastics for wood is also making progress, particularly in the field of cooling towers.

Cooling towers using polystyrene grids have been in service for the past five years. Polyethylene—slower to gain acceptance because of its higher initial cost—is showing decided advantages in petroleum and petrochemical plants. Aromatic vapors, which are

THE COST CUTTING SERIES . . .

LUBRICATED VALVES Simplify Flow Control

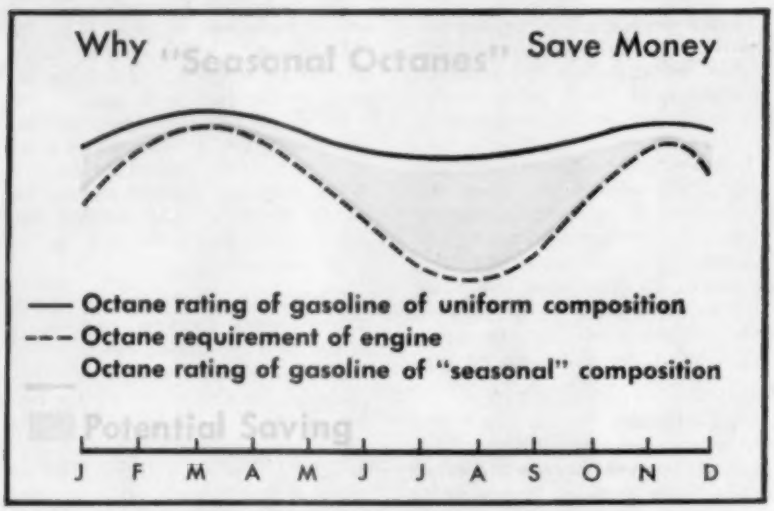
Refinery engineers report that lubricated plug valves greatly simplify flow control because they close with an easy quarter-turn . . . the wrench position shows at a glance whether the valve is open or closed. Rockwell-Nordstrom valves on the refinery products manifold (above) have also reduced repair and replacement costs. Lubrication is preventive maintenance that makes valves last longer by preventing metal-to-metal friction. Positive shutoff is assured by the tight seal of pressurized lubricant, and product contamination is eliminated by the lubricant seal between the plug and body. For further information on Rockwell-Nordstrom valves and accessories, write:

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

often present in the atmosphere of refineries, do not have any effect on polyethylene.

A new first in cooling towers has recently been completed at the Baton Rouge refinery of the Esso Standard Division of Humble Oil & Refining Co. It is a three-cell Fluor Products Co. tower, incorporating all polyethylene Poly-Grid fill. The tower measures about 90 ft. x 60 ft., and contains over 5,500 3 x 3-ft. grids.

All the plastics offered today in commercial quantities for such "replacement applications" have been developed in pilot plants and tried on a semicommercial basis for many years.


Why "Seasonal Octanes" Save Money
Octane rating of gasoline of uniform composition
Octane requirement of engine
Octane rating of gasoline of "seasonal" composition
Potential Saving
J F M A M J J A S O N D

Octanes Adjusted to the Weather

By adjusting the octane rating of gasoline to seasonal requirements, refiners can realize substantial savings. At least one of the major refiners is doing just that.

This is the result of extensive studies that have been carried out over a period of many years by Standard Oil Co. (Ohio), in cooperation with General Motors Corp. F. J. Sanders and E. H. Scott, of Sohio, presented the latest results to the recent Fuels & Lubricants meeting of the Society of Automotive Engineers, in Chicago.

This adjustment is possible because the octane value of gasolines and the octane requirements of car engines vary in the same direction with changes in the weather. But the octane requirements of cars vary substantially more than the octane ratings of gasolines.

Directionally, the octane rating of fuels and the octane requirements of engines:

- Increase with increasing ambient temperature and barometric pressure; and
- Decrease with increasing absolute humidity.

A comparison between the increase —or decrease—of the octane rating of the gasoline and the octane requirement of the engines shows that it is possible to make use of these differences.

The octane rating of the gasoline manufactured can be adjusted seasonally to a level just high enough to satisfy the seasonal octane requirements of the engines (diagram).

Over a broad geographic area, the same patterns of weather seem to occur every year, according to the Sohio engineers.

"In all areas of Ohio," they reported, "the maximum octane requirement values occurred in the spring and fall seasons, and the minimum values in the summer."

Adjusting octane number seasonally has two main advantages: It saves costly refinery octane numbers, and it saves money for the customer by giving him the highest octane only when needed.

"Economically," the Sohio engineers point out, "if one octane number today is worth 10.5¢ per bbl. excluding taxes, and a seasonal adjustment of the octane ratings can save one octane number average a year, the industry will realize a saving of $140-million a year."

What's New
IN PROCESSING

Oronite Chemical Co., a subsidiary of Standard Oil Co. of California, is using a new laboratory test procedure to predict low-temperature field performance of compounded motor oils.

The new test method, which is expected to minimize the need for future field testing, involves data collected from more than 8-million mi. of road testing in various types of automotive engines.

Definite correlations have been found between piston varnish deposits obtained in lab tests and oil-ring deposits in field engines. These deposits are the prime factor in oil consumption which, in turn, determines useful engine life.

The procedure, developed by California Research Corp., is actually a modification of the standard 40-hour, FL-2 engine test devised by the Coordinating Research Council.

•

During its current seven-year plan (1959 to 1965) the USSR plans to build a refinery with a crude throughput of 230,000 b/d, according to Tass, the Russian news agency.

The refinery is to be built in two separate identical units, and completely integrated from crude to a full line of products.

•

Automobile manufacturers have been urged to make exhaust-control devices "standard equipment on all 1961 models."

Rep. Kenneth A. Roberts (D.,Ala.) told the House last week that his subcommittee on health and safety will hold a hearing at which auto maker and public health officials will be asked for specific information on new exhaust-control devices.

Manufacturers plan to install a device on all 1961 cars offered for sale in smog-plagued California to capture raw fuel escaping past the piston rings into the crankcase and send it back into the engine to be burned.

•

Home Oil Co., Ltd., may double capacity within the next year at its still-not-completed Carstairs (Alberta) gas processing plant.

The $3.7-million plant (PW—May 8'59,p23), set to go on stream in about a month, is planned for a capac-

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FARROWTEST is offered as an alternative to other less positive tests at no increase in cost. Carbon steel Heat Exchanger Tubes produced to ASTM specification A-214; stainless steel Heat Exchanger Tubes to A-249. Both specifications include eddy-current requirements.

As a tube buyer and user, you owe it to yourself and your company to get ELECTRUNITE and FARROWTEST facts firsthand. Call your Republic representative. Or, write direct.

FARROWTEST REJECT TABLE

Wall Thickness (B.W. Gage)	Minor dimension of the defect (Length or Depth)	Defective Area (Length, Depth Plane)
20	.006"	.0025 sq. inches
18	.006"	.003 sq. inches
16	12½% of wall	.003 sq. inches
14 and 13	12½% of wall	.004 sq. inches
12 and heavier	12½% of wall	.005 sq. inches

FARROWTEST detects and rejects not only tubing containing defects which completely penetrate the wall; but also tubing with defects equal to, or greater than, those shown in this table. For irregular defect shapes, a tube with defect area equal to or greater than shown above is rejectable. Where required, sensitivity of FARROWTEST equipment can be calibrated to reject defects of lesser specified area than shown in table, at extra cost.

FARROWTEST—quality measured for you. Not a laboratory theory, not a mere inspection tool, but an exclusive production test that detects and rejects tubing containing defects of critical size. FARROWTEST is offered as an alternative to other less positive tests in accordance with the table, at right, at no extra cost.

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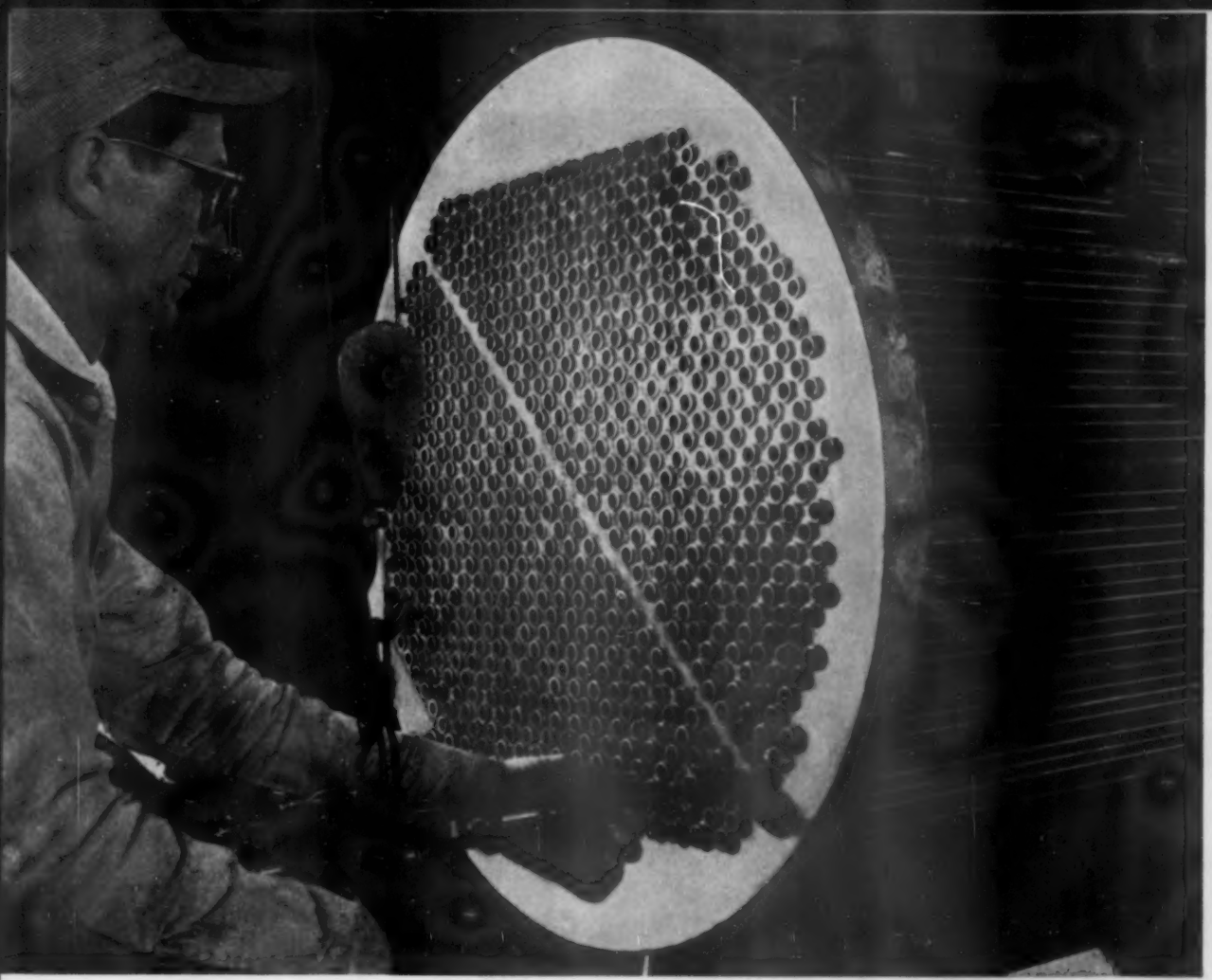
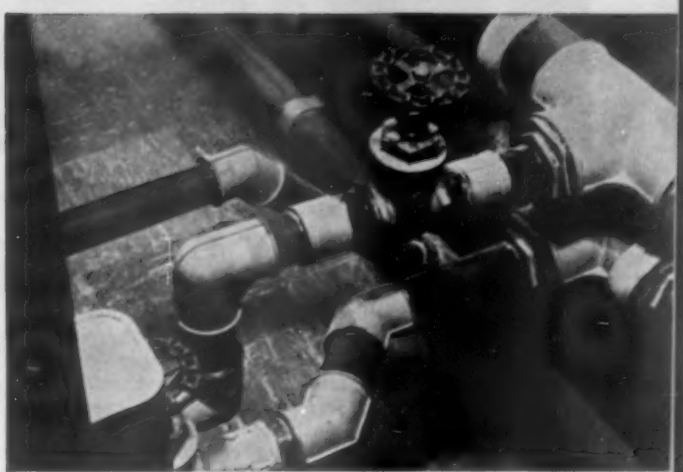
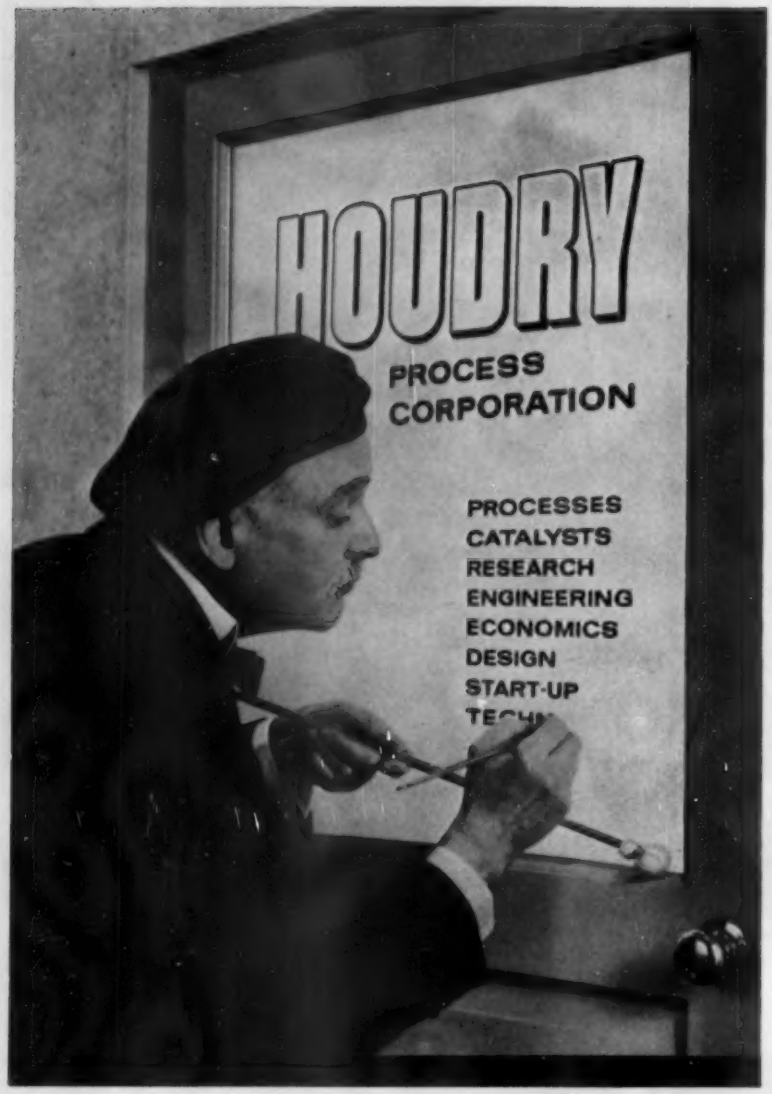




REPUBLIC SRK PLASTIC PIPE is extensively used to make up spray headers and bars in cooling towers. SRK resists corrosion and scale build-up. It is tough yet light in weight and easy to handle, and eliminates heavy supports required with conventional piping. SRK also is widely used for carrying corrosive fluids and wastes.

REPUBLIC ALLOY STEEL STUDS AND HIGH CARBON HEX NUTS provide the strength needed in high pressure equipment. High tensile strength with tough threads offers maximum holding power and resistance to wear. Tighten smoothly, back-off easily. Write for data and details.



ADDING TO THE LIST OF HOUDRY SERVICES

A good many petroleum and chemical processors have found profitable reading in the growing list of "what Houdry does."

Availability of contract research, for instance, enables processors to "farm out" projects ranging from development of theories to pilot plant tests of processes and chemicals. Houdry contract technical service helps keep plants operating at peak performance levels.

And while you may contract for one or more *specific* services, you can often derive additional direct benefits from *other* services and other phases of Houdry's operations at the same time. Your contact with any section of Houdry's technical service group also makes the experience and knowledge of the *whole* group available for application to your requirements.

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*Houdry means Progress...through Catalysis

ity of 75-million cf/d. But Home says it will probably have to expand it substantially as the result of the completion of a seventh successful gas well, and the resulting increase in estimates of the field's reserves.

•

Simplified versions of many official test methods used in petroleum processing have just been published by Universal Oil Products Co.

The fourth edition of "Laboratory Test Methods for Petroleum & Its Products" contains 89 methods, chosen for their simplicity and utility. Certain of these tests can be run on the spot by process operators. Others are intended for laboratory personnel.

None of them supplant methods published by the American Society for Testing Materials, the American Public Health Assn., API, or others, UOP says. They supplement these standards.

•

A 5,500-ton-per-year phthalic anhydride plant will be built in Brussels by Union Chimique Belge S.A. Badger N.V., The Hague, has the construction contract for the $2-million installation.

•

Engineering

A new mass flowmeter that measures liquids in pounds, instead of cubic feet, has been developed by General Electric Co.

The device, which can be applied to a variety of viscosities, densities, and flow rates, uses a gyroscope to measure a torque proportional to the mass rate of flow. Here's how it works:

The fluid passes through two similar wheels—one rotating at a constant speed, the other stationary. The rotating wheel gives an angular momentum to the fluid; the fixed wheel removes this momentum, thus creating a torque proportional to the mass rate of flow.

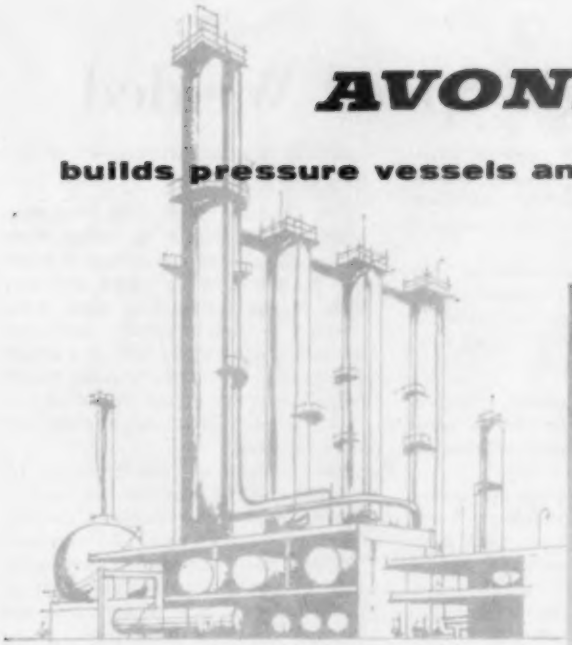
The resulting torque is applied to the "minor axis" of a gyroscope mechanism, which rotates around its "major axis" at a rate proportional to the torque, and therefore proportional to the mass rate of the fluid flow.

This rotation is transferred through a gear train to a register, where the flow is totaled and registered in pounds.

Since the device eliminates measuring the density of a fluid in order to convert from volume to weight, it will probably be most useful for measuring chemicals in a process, or loading fuel on an aircraft.

AVONDALE

builds pressure vessels and fabricated steel products



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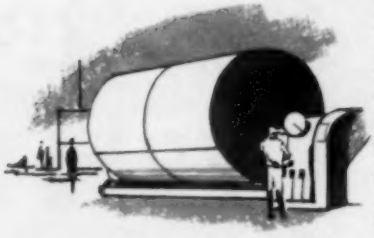
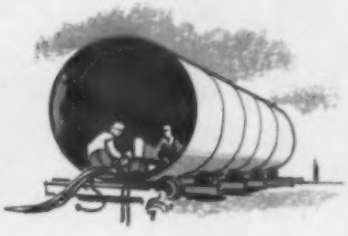
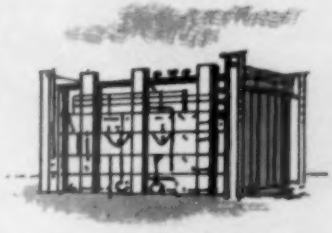


Plate rolls will accept any thickness up to 4½"



Automatic welding of longitudinal seam in pressure vessel



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Big Pipe Will Be High-Speed Welded

High-frequency electrical resistance welding, a cost-cutting method already used to make small-diameter pipe, will be used for the first time in the fabrication of pipe up to 36-in. by Big Inch Pipe Corp., of Calgary.

Big Inch will use the process to make pipe for both natural gas and crude transmission. It will be of heavy-wall, high-pressure construction.

The weld will produce a pipe that conforms to API standards, according to Big Inch.

Main advantage of the technique is that it eliminates many operations that are required in other conventional welding methods, according to the company.

Big Inch estimates that the welding process will cut labor costs to one-third compared to the amount needed to make pipe by other methods.

New Rochelle Thermatool Corp., which originated the process seven years ago, reports that one company is able to use it to make tubing of 3 in. in diameter at the rate of 300 ft. a minute.

And New Rochelle says that it would be possible to produce large-diameter pipe at 150 ft. per minute with the high-frequency resistance process, if a mill's mechanical setup is geared to that speed.

Among the companies that are now employing the method in manufacturing small-diameter pipe are Cal-Metal Corp., Southern Pipe & Casing Co., and Republic Steel Corp.

By using high-frequency electrical resistance welding, pipe can be fabricated in one continuous process on one assembly line.

Here's how the operation works: The flat strip is fed into the mill and formed into a round, open-seam pipe. The seam is passed under a pair of sliding weld contacts, which introduce the high frequency current into the metal. The current heats the edges, so that when the pipe reaches the squeeze rolls a forged weld is made.

In conventional submerged arc welding—a popular method—the round, open-seam pipe must first be tack-welded every 3 ft. to keep the edges aligned. Then a longitudinal outside weld is made, and the pipe is transferred to another station, where the inside weld is made.

The reason that high-frequency electrical resistance is faster than conventional methods is that it heats only the edges to the joined, and very little of the surrounding pipe area.

In the high-frequency resistance method, each contact acts as a return conductor, so that the current travels only along the actual edges of the pipe, with very little dissipation of current and heat.

In conventional, low-frequency resistance welding, however, the current arcs across the seam between the two contacts, "stitching" it together. What actually happens in this operation is that the current and heat go beyond the contacts on each side and become dissipated in the pipe.

Because only the actual edges are heated in high-frequency resistance welding, heat damage to the surrounding area also is eliminated to a great degree, as compared with other methods, according to New Rochelle Thermatool.

Precleaning of the pipe isn't required with high-frequency electrical resistance welding as it is with other methods.

This is because oxide coatings, scale, and segregated metal, which impede the current in standard low-frequency resistance welding, act as auxiliary dielectric conductors for the high-frequency resistance current.

In addition, the high-frequency resistance process produces a nearly spatter-free weld.

Big Inch expects to start pipe production on May 1 in its Calgary mill, which is now nearing completion.

The welding equipment and generators will be supplied by New Rochelle Thermatool Corp. Mechanical equipment will be furnished by Torrance Mfg. Co., of Torrance, Calif.

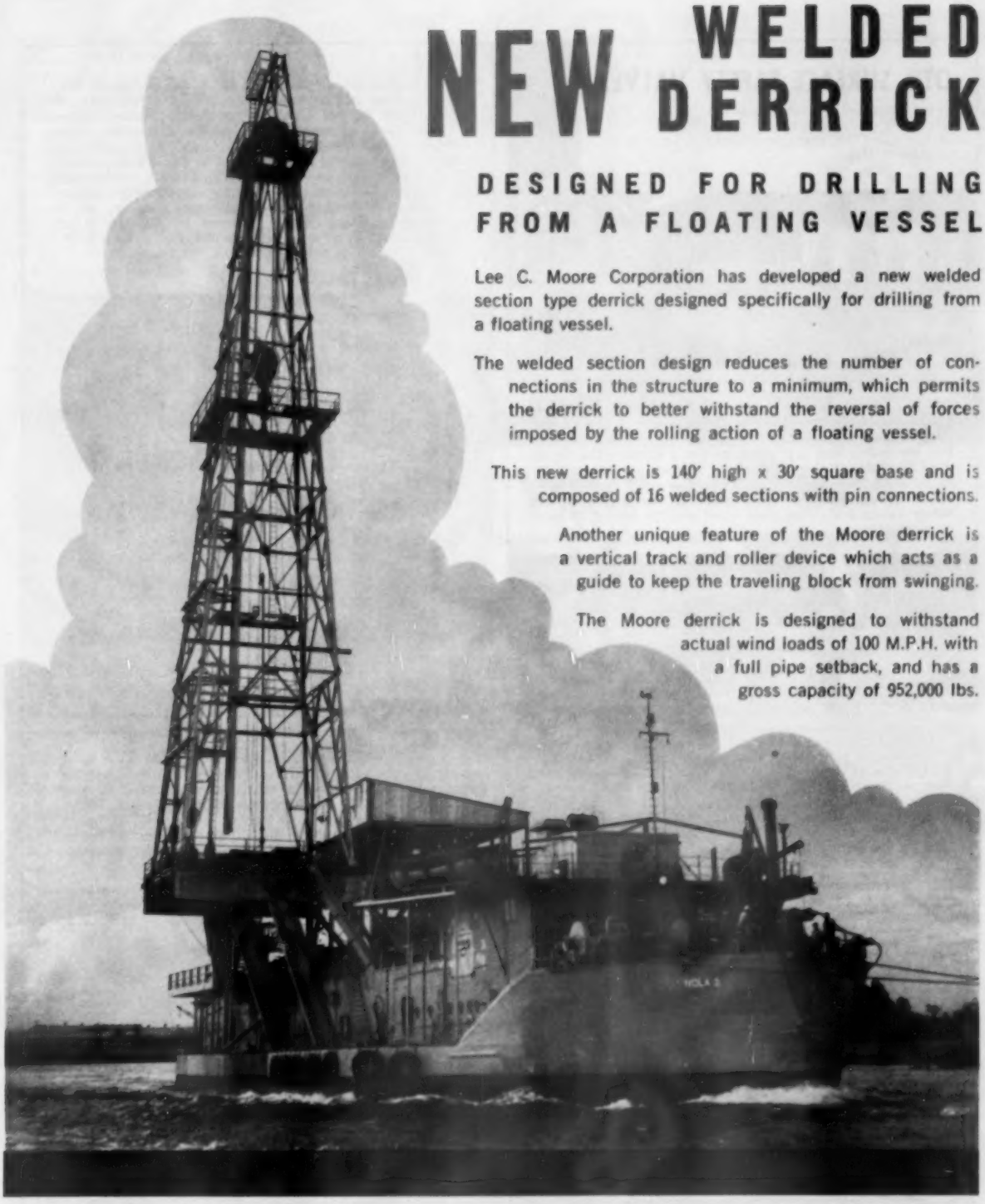
Initial production goal will be 120,000 tons a year of pipe in diameters of from 18 in. to 36 in. Wall thickness will range up to .500 in.

Actual production capacity of the $4-million mill will be greater, however. "We can go as high as 180,000 tons yearly," says a company official, "We will be able to spit out the pipe that's needed, when it's needed—and it looks as though a terrific tonnage will be required."

Big Inch hopes to be able to produce pipe cheaply enough with the

Cold, Rock Fail to Slow Gas Line

Despite subzero temperatures and rocky terrain, construction has moved ahead steadily on this northern Arizona spread of Transwestern Pipe Line Co.'s natural gas line from West Texas to California. This spread is being built by H. C. Price Co., whose crew is double-jointing the 30-in. pipe. On all spreads, more than 625 mi. of pipe have been welded so far. Completion is scheduled for July 1.



NEW WELDED DERRICK

DESIGNED FOR DRILLING FROM A FLOATING VESSEL

Lee C. Moore Corporation has developed a new welded section type derrick designed specifically for drilling from a floating vessel.

The welded section design reduces the number of connections in the structure to a minimum, which permits the derrick to better withstand the reversal of forces imposed by the rolling action of a floating vessel.

This new derrick is 140′ high x 30′ square base and is composed of 16 welded sections with pin connections.

Another unique feature of the Moore derrick is a vertical track and roller device which acts as a guide to keep the traveling block from swinging.

The Moore derrick is designed to withstand actual wind loads of 100 M.P.H. with a full pipe setback, and has a gross capacity of 952,000 lbs.

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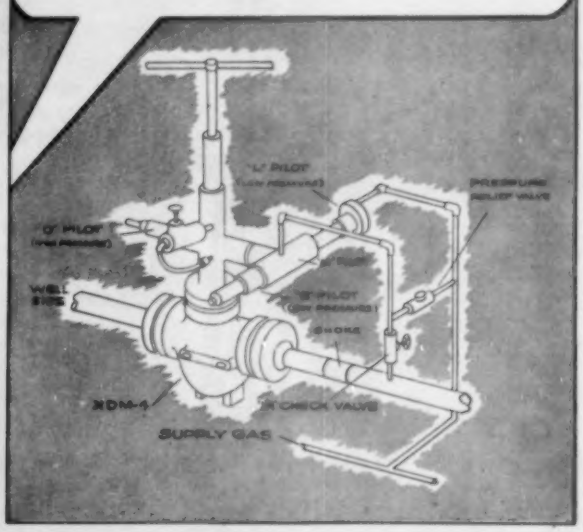
1.

OTIS SURFACE SAFETY VALVES

—equipped with automatic pilots—shut in the six wells on this platform and PREVENTED A MAJOR FIRE that could have cost us several million dollars.

2.

Here's a diagram of the safety valve and automatic pilot installation we had on this platform. Each of the six wells had a Type XDM-4 Otis Surface Safety Valve installed between the wing valve and the choke. The safety valves and pilots were installed so as to (1) shut in an individual well should a freezing condition exist in a flow line or choke; (2) shut in all wells on the platform should a flow line break, or (3) shut in all wells on the platform should the gas sales line break, or should something happen to any of the auxiliary equipment on the platform. In this case it was high temperature on a heater that activated a Type L Otis Pilot to shut in all the wells.

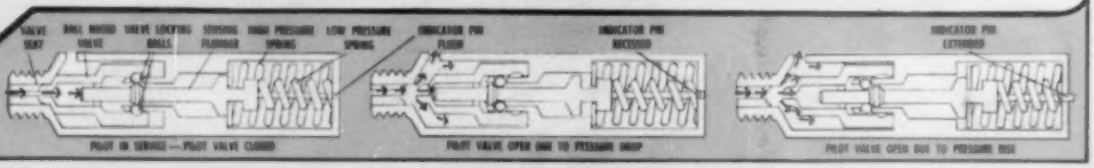


3.

The six wells were producing 32 M.M.C.F.D. when an equipment failure boosted the temperature in one of the heaters to about 1,000° F. This set the platform on fire. But we didn't lose our wells or the platform—thanks to the Otis Safety Valves. When our pumper got out here he found all of the wells shut in, and only a small fire burning, which he extinguished. After making minor repairs, the safety valves and pilots were reset and the wells put back on production.

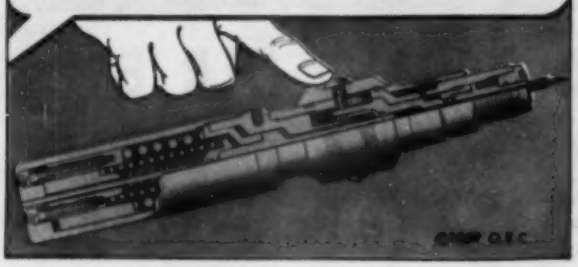
4.

Speaking of resetting pilots, have you seen the new Type E Otis Hi-Lo Pilot? It's so simple to set and reset a boy could do it. These schematic diagrams show the pilot in its three operating positions: set and ready to operate; opened as a result of a pressure drop; opened as a result of a pressure rise. The new Type E pilot has many features we like. To list a few—it's quiet. There's no loud pop when it opens. The standard model is rated to 8,000 P.S.I. and we can get higher pressure ratings on special order. The Type E is adaptable to remote control or external control systems using electricity, hydraulic pressure, or microwave. You can trip the pilot manually without any special tools. We've found the pilot accurate to plus or minus 1%. It has a visual indicator to tell you when the pilot is locked out of service, and another indicator to tell you whether the pilot operated due to a pressure rise or drop.



5.

To get back to resetting the Type E Otis Hi-Lo Pilot—here's all you do. After the pilot has operated you twist this reset collar to the right. This closes the pilot and exposes a red band, which is a visual indication that the pilot is locked out of service. When the indicator pin is flush with the end of the pilot you can put the well back on production by twisting the reset collar to the left. We'll be using a lot of these pilots in the future because of their simplicity and many advantages.



6.

The Otis Surface Safety Valves and Pilots we installed on our platform only cost $6,500. That's a pretty small investment to protect a several-million-dollar installation. And this isn't the first time Otis safety equipment has saved us a substantial loss. Experience has taught us we can rely on Otis safety equipment. If you have ANY UNPROTECTED WELLS—especially in isolated locations or in critical areas—I suggest you call your nearest Otis office now. Let an Otis safety valve expert help you work up the proper safety program for your wells—TODAY—BEFORE YOU NEED IT.

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process to capture a big share of the new market that would be created by approval of the two current Canada-to-U.S. gas export plans.

One of the export proposals calls for construction of a 1,353-mi. pipeline from west-central Alberta to San Francisco at a cost of $331-million (PW—Dec.18'59,p48).

The other proposal is the line of Trans-Canada Pipe Lines, Ltd., from its Canadian main line to Emerson, Manitoba, on the U.S. border (PW—Jan.29'60,p30).

The Canadian portions of the proposed lines, not counting their U.S. extensions, would require 300,000 tons of pipe in diameters of 18 in. to 36 in., Big Inch estimates.

Movable Dock Aids LPG Unloading

A movable dock from which barges can be unloaded at any river level without use of long hoses has been put into operation by Cities Service Oil Co. at its new Mississippi River LP-gas terminal located at Lake Village, Ark.

The 600,000-gal. terminal was completed in November, but is just now going into full-scale operation.

In building it, Cities Service faced a problem common to most Mississippi barge-unloading facilities: an erratic water level.

When conventional pile-cluster docks are used, the problem is solved laboriously by using long unloading hoses to reach down to the barge when the river is low, and up when the river is high. In addition, different length

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hoses may be needed from day to day as the water level changes.

The dock is mounted on wheels and is rolled up or down an inclined ramp by a winch, which maintains it at the level of the barge.

There are two pairs of wheels of 36-in. diameter, which run on 3-ft.-wide concrete ramps. The ramps extend from low-water level upward for 130 ft. to the top of the bank.

The dock's frame was built at an angle to the ramps, so that the 20x20-ft. deck remains horizontal as the unit is being lowered or raised.

Height of the dock at the front is 10 ft. When it's in use, it is positioned so that 4 to 6 ft. are above water.

The dock is equipped with two flexible hoses, which are manipulated by derricks mounted on the dock.

The derricks have 15-ft. booms. When the lower ends of the hoses are connected to a barge, the booms lift the upper ends and carry them to takeoff connections in a pipe trench alongside the ramp. LPG is unloaded through one hose and vapors through the other.

At present, there are five takeoff connections in the trench, at 25-ft. intervals. As barge shipments grow, Cities Service plans to add takeoffs at 8-ft. intervals.

From the terminal LPG is distributed by truck in Tennessee, Mississippi, Alabama, and Arkansas.

Lake Village was chosen as the site of the terminal because it's at one end of the only bridge over the Mississippi between Memphis and Vicksburg.

The terminal is equipped with a truck-loading rack capable of loading 600 gal. a minute.

Distributor of the LPG is Propane Corp., a wholly owned subsidiary of General Gas Corp.

Cities Service ultimately plans to increase the terminal's capacity from the present 600,000 gal. to 900,000 gal.

Presently, only propane is being stored there, in above-ground pressure tanks. Later, however, the company plans to store butane there too.

The terminal is supplied from Cities Service's Lake Charles (La.) refinery.

What's New / IN PIPELINES

Natural Gas Storage Co. of Illinois has sought authority to store additional gas in its Herscher Dome aquifers to permit increased withdrawals of 75-million cf/d (PW—Sep.4'59,p48).

Natural Gas told the Federal Power Commission last week that a boost in withdrawals from the present 500-million cf/d to 575-million cf/d was needed to supply 47,000 new space-heating applicants in Chicago.

•

Union Tank Car Co. will build two LPG tank cars of 30,000-gal. capacity—for a new size record—for Tuloma Gas Products Co. The largest LPG car now in service, also built by Union, has a capacity of 21,700 gal.

The new cars, called Hot Dog-30s because of their shape, will have an outside tank diameter of 99 in. and a length over the couplers of 85 ft.

•

The Russians report they are using plywood pipelines in their Baku oil fields as an effective solution to the problem of sulfur corrosion.

Sulfur content of the crude from some Baku fields is so high that many steel lines had to be replaced every two or three months, the Russians say.

The new plywood lines reportedly are being used to transport water.

•

A new method of cleaning the interior of pipe by sandblasting after it's in the ground has been successfully tested on a 3-mi. section of a Tennessee Gas Transmission Co. line under the Trinity River, in Texas. It's called the Klean-Kote system, and was developed by J. D. McCune, LaPorte, Tex.

Under the system, sand is forced into the line under high pressure by a compressor mounted at an opening in the line, either a pig trap or a fitting, and is exhausted at the next opening.

•

An annual rate boost of $11,637,115 is being sought by United Gas Pipe Line Co. It told the Federal Power Commission that the increase is made necessary by higher wellhead prices.

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World Oil Overcapacity Will 'Worsen,' and

This warning was issued by Stanvac's Harry W. McCobb

World oil overcapacity "will only worsen" in 1960, and be with us for "many years to come," Harry W. McCobb, vice-president of Standard-Vacuum Oil Co., warned this week.

McCobb told the annual meeting of the American Institute of Mining, Metallurgical & Petroleum Engineers that overcapacity to produce stands out like "the traditional sore thumb" in a review of foreign oil production in 1959.

The trend got bad in 1958, and worse in 1959, he said: In 1957, 4.2-million b/d of potential production were shut in; by the beginning of this year it had reached about 6-million b/d.

North Africa will be the chief cause of a "severe dislocation" in crude supplies, McCobb predicted.

Middle East, Venezuela will be hardest hit

This crude will have a market in France and Western Europe, he said, and will affect principally the Middle East and Venezuela.

There is no doubt whatever, he declared, that North Africa will be the center of exploration and development for several years.

Algerian reserves have been estimated "as high as 10-billion bbl.—or about one-third the known reserves of the U.S.," McCobb pointed out.

In a little more than a year, he said, it is expected that France will get most of her oil needs of about 500,000 b/d from the French Sahara.

But reserve estimates for Libya are "even more spectacular," he said, "as high as 50-billion bbl.—enough to supply 1-million b/d for the next 150 years."

Libyan reserves are really 'spectacular'

Since Jersey Standard's huge Zelten discovery in the spring of 1959 tested at 17,500 b/d, the Stanvac vice-president said, 13 more discoveries were made up to the end of the year. (Stanvac is jointly owned by Jersey Standard and Socony Mobil.)

And, he added, "Libya has been called the 'top prize of the world's oil hunters' because of the phenomenal success ratio of its wildcats."

McCobb also pointed out that reserves of just Libya's Zelten field alone "are estimated equal to all Algeria's."

The Zelten reserves have been estimated as high as 10-million bbl., he said, and "it was thought originally that the field might rival Aramco's mammoth Ghawar field in Saudi Arabia, one of the world's largest."

Oil output scored advances in other parts of Africa during the year, too, McCobb noted.

Venezuela Oil Labor Pact Seen 'Good'

CARACAS—Labor peace in the oil industry in Venezuela—without loss of management prerogatives—was assured this week.

The big three oil companies signed a three-year contract, providing wage increases of from 10% to 12%. The contract reduces the work week from 48 to 44 hours for laborers, and from 44 to 40 hours for office employees.

The oil industry here considers the new labor agreement "a good contract."

The companies have yielded nothing of substance on those union proposals that would have infringed management prerogatives.

The government estimates that the contract will add $106-million annually to the industry's labor costs.

But for political reasons, that estimate may be high. The companies have not broken down costs yet.

The contract represents a drastic comedown from Fedepetrol's original demands last September, which, the companies estimated, would have added $1.3-billion to the industry's labor bill.

Under the old contract, the industry's annual labor bill was around $400-million.

The government will bear 47.5% of the added cost through loss of income tax revenue.

The new contracts of Creole, Shell, and Mene Grande cover about 35,000 of the industry's 43,000 oil workers, and set the pattern for other oil companies.

Wage increases range from 10% to 12%.

Around 60% of the industry's workers, earning up to $290 per month, get a pay raise of 12%.

Workers earnings from $290 to $388 get an 11% pay hike. And those with still higher earnings get a 10% raise, up to a maximum of $65 monthly.

Fedepetrol had originally demanded increases of 15%, 18%, and 20%.

Will Continue for 'Many Years to Come'

In Gabon, in French Equatorial Africa, the 1959 program included 15 exploratory tests and 17 extension wells, he said. An important new discovery was made at Rembo Kotto, and may give Gabon inland production for the first time.

The North African discoveries were beginning to be felt in every major oil-producing area of the world by the end of last year, he said. Especially in Venezuela, where shut-in capacity grew to 1-million b/d. And there are now 9,300 shut-in wells there, McCobb added.

At first, the 5% increase in Venezuelan output was called "normal and satisfactory" by the government. As 1959 wore on, the effect of U.S. import quotas, the cheapness of Middle East oil, and the growing Russian imports—in addition to the importance of North African oil—made it seem "evident that such increases could not automatically be counted on in future years," he said.

New interest in Middle East wanes

As 1959 drew to a close, only one seismograph crew was operating in Venezuela, compared with 35 to 40 crews a year ago.

Drilling has fallen off sharply, McCobb said, with only about 51 rigs active compared with 123 two years ago.

Overcapacity has had its effects in the Middle East, too. "Less interest was shown in the acquisition of new oil concessions than at any time in the past 15 years," McCobb said.

"Certainly lack of interest was not caused by any pessimism concerning the great productive capacity of the region." He cited its production rate for 1959, which was up 7% to 4.6-million b/d.

Royalty and tax payments in the Middle East, he added, approached the record amount of $1.3-billion set in 1959. "Had it not been for the lower price of crude this year," McCobb said, "they would, of course, have established an all-time record."

However, he pointed out, oil men expect Middle East output to climb 5% in 1960. But beyond that, he said, any increases foreseen are on a "more modest" scale.

McCobb singled out one important advantage overcapacity has brought: a better understanding between producing nations and international oil companies.

Relationships for the most part are amicable, and "there are determined efforts on both sides to solve the problem so that all may exist profitably."

An example: the sudden turnabout in attitude toward changing the 50-50 formula.

"It is true," McCobb said, that 50-50 was "broken by the Japanese agreement in the Neutral Zone. But that action was negotiated before the intensity of competition became the toughest in the history of oil."

He continued: "The Sudan rescinded a provision which called for upping the government's share of 70% after ten years of development, and a straight 50-50 was passed. Spain enacted a 50-50 law during the summer, covering the Spanish mainland and its African possessions. A new oil law was also passed in Greece, which further solidified the time-tested formula. Meanwhile, the Arab League dropped its efforts to modify existing contracts.

Oversupply strengthens 50-50 formula

McCobb urged watching the advance of Russia in the world oil picture. "That nation has made tremendous strides," is a net exporter, and appears willing to use oil for political purposes.

McCobb concluded that the very fact that there is overcapacity to produce is comforting, even though it's "a disturbing factor" for the free world. "The oil companies, operating as private enterprises, have pushed ahead in finding and developing crude over such a wide area in such abundance that the end result is beneficial to the long-range security of free people everywhere."

Pay increases and other economic benefits are retroactive to Oct. 20, 1959, date of expiration of the old contract.

The shortening of the work week will require additional employees, mainly on shift work. It's expected to add around 2,000 workers to the industry total.

The agreement to provide hospitalization for workers and families in the western fields is regarded by the companies as "a tremendous concession." Arrangements will be worked out within 90 days.

New housing benefits are also a costly item. The companies agreed to continue present housing programs, and to provide a minimum of 100 sq. ft. of floor space per family member in new construction.

In cases where companies don't provide houses, the daily housing allowance per worker is raised from $1.60 to $2.25.

The companies also agreed to reduce prices on 19 commissary articles, and to add another 29 items to the commissary list.

There are no important changes in the school program, which was one of the most expensive demands in Fedepetrol's original draft contract.

The companies say they did not make any concessions that would curtail management control of operations.

Fedepetrol's initial demands included 25 different instances of interference in management decisions. The only concession on this point is a strictly limited provision for arbitration of disputes involving not more than $6,500. In case a company and union can't agree on the third member of the arbitration board, the case goes to the Labor Ministry.

With regard to union hiring, the companies agreed only to "take into consideration" union lists of candidates for employment.

Elimination of oil industry contractors was also an important Fedepetrol demand. There are no significant changes in contracting, although some further protective measures are set up for contractor employees.

In describing the contract as a good one, industry spokesmen emphasize its three-year duration, and observe, "It's not going to put the oil industry out of business."

Arabian Oil discovery is key factor as . . .

Battle for Japan Market Sharpens

(By cable from PETROLEUM WEEK'S *Tokyo Bureau)*

TOKYO—There is every sign that Japan's bitterly contested $300-million-a-year market is going to get even more competitive now that a Japanese company has struck oil in the Persian Gulf.

"I'm glad I'm not in the crude business" was the half-serious comment of a Japanese-American company's marketing expert this week. And he's typical of many oil men here.

Crude prices to Japan are falling, forced down by the growing glut of Middle East crude. And they may get a lot lower before they stop falling.

The Japanese government may force Arabian Oil's crude on the market, further complicating the neck-and-neck race. And soon crude suppliers may find it necessary to join the fray if they are to hold their markets.

At the moment, the marketing spectrum looks something like this:

(1) California-Texas with its Japanese partners, Nippon Oil and Koa, have about 19% of the market;

(2) Stanvac and its Japanese refining partner, Toa Nenryo, and refining-marketing partner, General Bussan, have about 16%;

(3) Shell and its Japanese partners, Show and Showa Yokaiichi, have about 15%;

(4) Idemitsu, an independent with a long-term crude supply agreement with Gulf, has 14%;

(5) Maruzen, an aggressive independent with strong ties to Union Oil, has 12%; and

(6) Mitsubishi, half Tidewater since before World War II, has 9.6%.

There are several smaller independents whom the Ministry of International Trade & Industry is pressuring to form larger units.

Snappier competition is due, too, from new faces in the market-place.

British Petroleum is becoming active, and is apparently ready to open its own permanent office. And Compagnie Francaise des Petroles has put a toe in the door by loaning Asia Oil Co. $5-million; Asia, in return, signed a nine-year crude contract.

In addition, American Independent Oil, Phillips, Union Oil, and others are also sending in delegations.

No other market in the world has so few secrets as the Japanese. The reason: Japanese oil importers are at the mercy of an elaborate foreign-exchange allocation system.

All 16 crude importers get their foreign exchange through a system of complicated calculations by the Ministry of International Trade & Industry (MITI). Allocations are calculated 50% on volume of the past three years' imports and 50% on their value. A company that manages to buy at lower prices thereby ups its quota under the system during the next six months.

But the system of awarding allocations every six months has a tendency to cut the normal market value of a long-term crude contract.

"This is the only place in the world where a long-term contract with lower prices has little or no appeal," says one crude salesman.

Meanwhile, the Japanese boom, paced by mushrooming industrial exports, is rapidly pushing petroleum demand up. And despite a 2% tariff on crude (soon to be hiked to 6%) and of 6.5% on fuel oil (soon to go to 10%), the switchover from Japan's low-grade coal to oil has gone on.

But a MITI petroleum expert this week opined that volume growth of the market may not exceed the fall in crude prices. He said that next year MITI, while allowing for a 15% boost in volume of imports, may not actually allocate more foreign exchange.

Into this tight little free-for-all last week walked Arabian Oil Co., with its new strike in the Persian Gulf.

The company's No. 1 well came in flowing at the rate of 6,290 b/d, Arabian said. And it plans to drill eight or nine more tests before the end of the year (PW—Feb.5'60,p11). It hopes to be delivering crude to Japan by the end of 1960 or early 1961.

Arabian has changed is tune about world marketing possibilities. It now admits that the chances of marketing its oil outside Japan seem remote—especially since North African crude has become a reality. A spokesman says an international sales campaign would be difficult for the company to undertake, and suggests that the firm hopes "to distribute production to all Japanese refiners without discrimination."

There is more and more likelihood that the government will back the company. All refiners in Japan may be forced to take a percentage of Arabian Oil's crude as throughput, whatever their other commitments.

At one time, the company had said it didn't want government help. But times have changed, and the company has been promised financial aid from the government (PW—Feb.12'60, p43).

It is now a matter of national pride to many Japanese that "their oil company" has "made the grade" in the Middle East.

And, as one official of Arabian Oil puts it, speaking of the company's operations and the government help: "There is an old Chinese proverb: 'Those sleeping in the same bed do not always have the same dream.'"

Japan's Arabian Oil Opens Beirut Office

BEIRUT—The Japanese-owned Arabian Oil Co. is setting up a regional office here, the Japanese Embassy told PETROLEUM WEEK. The company now has an office in Kuwait town.

At the same time, Pomeroy Construction Corp. is starting work on facilities to move out Arabian's oil. Pomeroy, in a joint venture with Hawaiian Dredging & Construction Co., International, has a contract with the Japanese firm to design and participate in building service and access facilities at Ras al Khafji, in the Neutral Zone—about 75 mi. south of Kuwait town.

The job includes preliminary development of a large modern shoreside service area, with construction of a marginal wharf 500 ft. long. It will include 18 mi. of service and access roadways.

Dredging will create a mile-long ship channel, 18 ft. deep and 250 ft. wide, from wharfside to deep water, and a protected inner-harbor turning basin. Completion of "salient" portions of the contract is required by May 1 of this year.

What's New / AROUND THE WORLD

VENEZUELA—The government is appropriating 2.5-million bolivars ($750,000 at the regular exchange rate) as the initial capital of its national oil company.

The appropriation is included in a special federal budget being submitted to Congress.

Initial capital will also include valuation placed on oil development parcels assigned to the company—some of which have already been selected, according to the Oil Minister. He did not identify the parcels, but observed that the value of a lot with some 20-million bbl. of reserves could represent $50-million to $60-million of capital.

•

LIBYA—Early this week Oasis Oil was testing some "good" oil shows in eastern Libya, south of Esso's Zelten acreage, after bringing in a new discovery in western Libya.

The company was testing shows in its B-1-25, in block 59, after carrying it to 6,263 ft. The A-1-59, to the north, had previously been abandoned at 7,263 ft., after some noncommercial shows. Oasis also recently abandoned its second dry hole in block 59, C-1-59, which was just south of Amoscas' Beda acreage.

The company's western discovery was its first on block 26, adjacent to Tunisia and Algeria. A-1-26, 250 mi. southwest of Tripoli, tested 40-gravity oil at the rate of 450 to 500 b/d from around 5,725 ft., with 1.3-million cf/d of gas. The company is now moving its rig 25 mi. west to spud its second wildcat, on a new structure.

•

SPANISH SAHARA—A group of U. S. oil firms already awarded oil rights here have refused to sign working contracts under terms proposed by the Ministry of Industry. The firms are Tidewater, General American of Texas, Sun Oil, and Indiana Standard's Pan American.

At the base of the trouble is the clause requiring companies to explore for a minimum of six years or to pay Spain the minimum legal investment for the same amount of time.

Meanwhile, Atlantic Refining filed for two more Sahara blocks—67 and 77.

•

BOLIVIA—Atlantic Refining has acquired an 80% interest in Drilexco's 1¼-million-acre concession in Zone I. Atlantic is exercising an option acquired late in 1958, and will drill an 11,000-ft. test about 60 mi. north of Santa Cruz.

•

BOLIVIA — Shell and California Standard are planning to drill their first wildcat this summer as a followup to a joint exploration program, which is still under way. The test will be in Zone 1 of the province of Santa Cruz, in the south-central part of Bolivia (PW—Oct.30'59,p40). The rig will be flown to the site.

•

MOROCCO — Construction will start "immediately" on the joint Italian-Moroccan refinery at Mohammedia, 19 mi. from Casablanca (PW—Oct.30'59,p40). The government awarded the contract to ENI's Snam-Progetti. The $14-million, 20,000 b/d unit, to be completed by 1962, will be run by Samir, owned 50% by ENI and 50% by Moroccan capital. The port of Mohammedia is capable of handling 12,000-ton tankers, or 40,000-ton vessels with offshore loading lines.

•

SAUDI ARABIA—Crude output in January hit a new all-time high of 1,221,177 b/d. This is 10,878 b/d higher than the previous record, set in November, 1959. It represents an increase of 23% over the January, 1959, output of 993,962 b/d.

•

SPAIN—A private Spanish company plans to boost capacity of its refinery in the Canary Islands from 60,000 b/d to 72,000 b/d. It is estimated that the expansion will cost Cepsa $11-million.

•

FRANCE—Domestic oil demand climbed 5.1% to 410,000 b/d last year, from 390,000 b/d in 1958. According to official sources, other demand figures are: French ship bunkers 28,000 b/d, down 2,000 b/d from 1958; foreign ship bunkers 6,000 b/d, down 4,000 b/d; exports by refiners to franc-zone markets 82,000 b/d, up 2,000 b/d; exports to foreign countries, 60,000 b/d, down 6,000 b/d; refining and distribution loss, 56,000 b/d; and stock changes 20,000 b/d.

New Arabia Peninsula Drilling Unlikely

Socony Mobil and Jersey Standard have pulled out from the group of companies conducting oil exploration in the Aden Protectorate. The remaining members of the group are expected to pull out eventually, too.

The oil rights for the Hadhramaut area of the Aden Protectorate have been held for many years by Petroleum Concessions, Ltd., an affiliate of Iraq Petroleum Co. (owned by Socony, Jersey, Shell, British Petroleum, Compagnie Francaise des Petroles, and the Gulbenkian interests).

Drilling rights in two sheikdoms in the area, near the town of Thamud, were recently worked out. However, seismic work has not indicated any large oil possibilities, and Socony and Jersey decided not to participate in further work in the area. Several other members of the IPC group are also understood to be considering pulling out.

Venezuela to Probe Oil Discount Sales

CARACAS—The government will investigate reported sales of Venezuelan crude at discount prices to a refinery "in bond" in New Jersey. The refinery belongs to Interamerican Refining Corp. (PW—Feb.5'60,p11).

Oil Minister Dr. Juan Perez Alfonzo said he lacked information on the sales, but warned, "It is not permissible for crude to leave the country at prices very much below the official sales price. If they pay the market price, that is normal."

The ministry previously halted discount sales by San Jacinto Petroleum to Canada, the Oil Minister said.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of February 15

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12-13
- Gasoline, 92 oct reg....10.75-11.5
- Kerosine....9.5-10
- Heating oil, No. 2....8.375-9.1
- Gas oil, 48-52 d.i....8.625-9
- Fuel oil, bunker "C"....$2.00-2.10

Caribbean, cargoes
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....11
- Gasoline, 87 oct research reg....10.125
- Gasoline, 79 oct research....9.375
- Gasoline, 70-72 oct motor method....9.25
- Kerosine....9.75
- Heating oil, No. 2....8.375
- Gas oil, 48-52, d.i....8.625
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- Kerosine....10.6-11.1
- Heating oil, No. 2....9.6-10.1
- Fuel oil, No. 6....$2.37-2.47

Okla.-Group 3, northern shpt., bulk
- Gasoline, 91 oct reg....10.5-11.25
- Kerosine....10.125-10.375
- Heating oil, No. 2....8.75-9.25
- Fuel oil, No. 6....$1.60-1.80

Chicago, bulk
- Gasoline, 91 oct reg....11-11.25
- **Heating oil, No. 2....9.125↓-11.35**
- **Fuel oil, No. 6 high sulfur....7.15↓-7.5**

Los Angeles, rack
- Gasoline, 88 oct reg....11.15-12.65
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.80
- Heavy fuel, PS 400....$2.15-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....5
- Propane, Baton Rouge....5.625-5.875

Pennsylvania Lubes
- Bright stock, 25 p.t....23
- 200 vis. neutral, 25 p.t....27

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i....25-26
- Neutral, solvent, 200-210 vis....21.5-22.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....25
- Neutral, solvent, 200 vis....21.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130....15.875
- Gasoline, 79 oct research....9.75
- Kerosine....10.625
- Gas oil, 48 d.i. minimum....9.875

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.62-2.97
- North Dakota, 36.0-36.9....2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - Mirando, 28.0-28.9....3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....4.55
- California, Signal Hill, 21.0-21.9....2.32†
- North Louisiana-Arkansas, 36.0-36.9....2.77-3.02
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.435
- Virden (Man.)....2.30

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 47.0-47.9, Tucupido....$3.34
- San Joaquin, 41.0-41.9, Puerto la Cruz....3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.78-2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.50
- Bachaquero, flat, Las Piedras....1.75-1.88
- Tarra, 38.0-38.9, San Lorenzo....2.83
- Lagunillas Heavy, flat, Las Piedras....2.10

†*Differential per deg. of grav. varies.*

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....$1.90
- Safaniya, 27.0-27.9, Ras Tanura....1.50
- Iran, 34.0-34.9, Bandar Mashur....1.86
- Iran, 34.0-34.9, Abadan....1.81
- Iraq, 35.0-35.9, Fao....1.80
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.67
- Qatar, 41.0-41.9, Umm Said....2.05
- Neutral Zone, Burgham, 23.5-24.4, Mina Saud....1.51
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud....1.38

Middle East, Eastern Mediterranean
- Arabian, 34.0-34.9, Sidon....$2.27
- Iraqi, 36.0-36.9, Tripoli, Banias....2.31

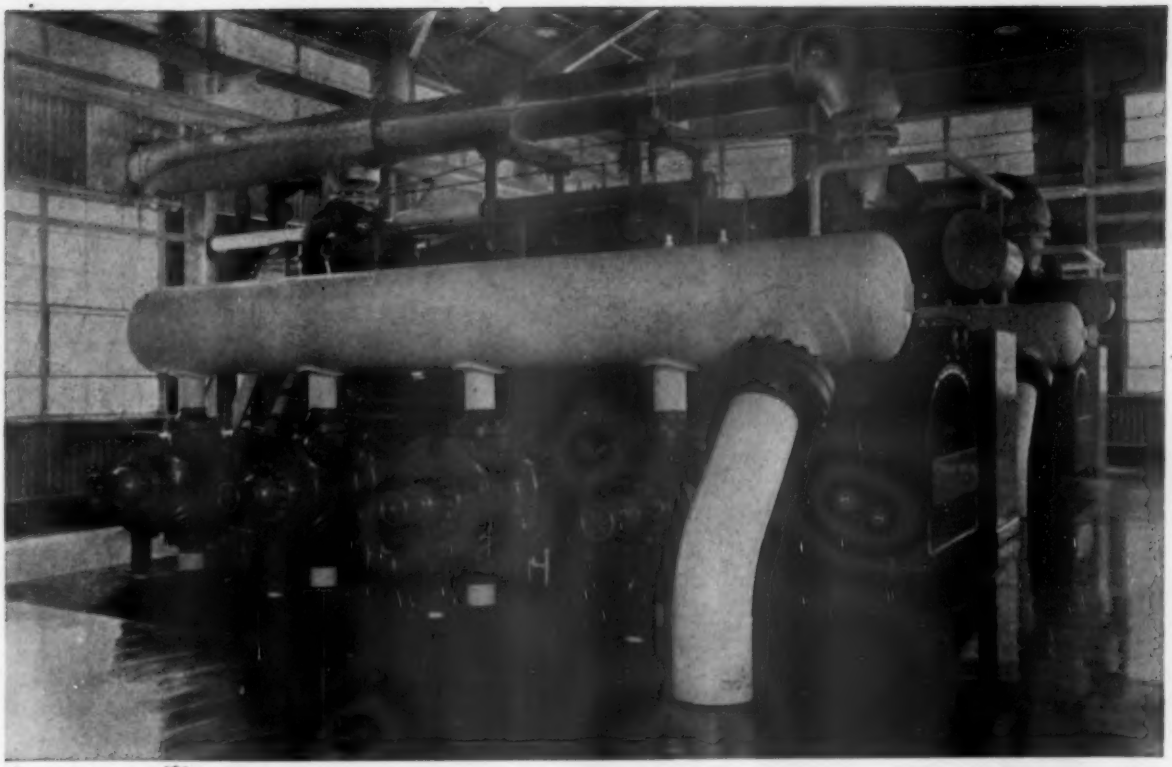
Far East, Cargoes FOB Lutong, Sarawak
- Seria Light, flat....$2.57

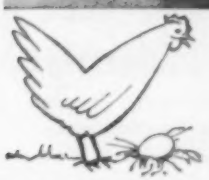
KEY TANKER RATES

(Last paid, per long ton, single voyage)

U.S. Gulf-New York, clean (USMC—22½%) $2.21↓
U.S. Gulf-New York, dirty (USMC—21¼%) $2.24↓
NWI-USNH, dirty....(USMC—55%) $1.24↓
NWI-UK/Cont., dirty....(Scale—51¼%) 16/9*↓
Pers. Gulf-UK/Cont., dirty (Scale—52½%) 29/6*↓
Persian Gulf-USNH, dirty....(USMC—60%) $5.08

**Sterling.*





which comes first...

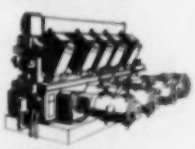
the ENGINE or the COMPRESSOR?

Of course, the power end of a gas-engine compressor is important. The engine cylinders must be capable of delivering smooth power in continuous operation, month after month, with efficiency and economy. And no engine can show better records of long run reliability and sustained efficiency than the Ingersoll-Rand 4-cycle V-angle design. The smooth running characteristics of the I-R 4-cycle engine are well-known.

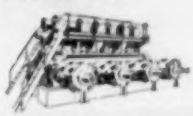
But don't forget the compressor end; after all, that's what you've really bought—a compressor! The sustained compression efficiency and freedom from maintenance troubles are what make the difference. Ingersoll-Rand has the world's most comprehensive compressor experience, and builds the widest line of units to suit the exact requirements of any application.

One of the major differences between I-R and other compressors is the valving. I-R Channel Valves are known around the world for efficiency, quietness, and almost unbelievable durability. Each valve is a combination of rigid stainless-steel channels and bowed leaf springs, with trapped-air spaces which cushion action and prevent impact. The separate stainless-steel seat plate can be reversed for double life or replaced, using only simple tools; the I-R Channel Valve is the only compressor valve that can be completely reconditioned in the field without machining. And only Ingersoll-Rand compressors have genuine Channel Valves.

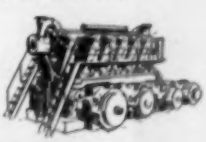
JVG 120-240 hp



SVG 330-660 hp



KVG 660-1320 hp



KVS 1000-2000 hp

ALSO
KVT 3000-4000 hp

4-CYCLE

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6-953

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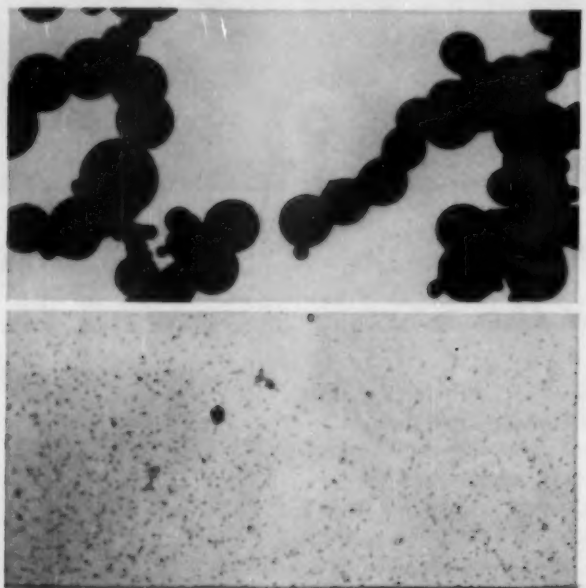
NEW FROM TRETOLITE.....



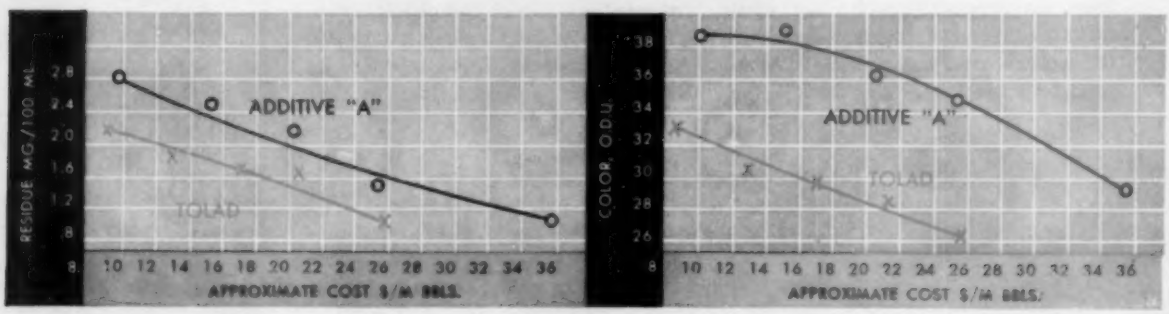
Above photomicrographs (magnification 6000X) show fuel oil samples after 12-week oven storage test. The upper photo is of a sample containing no additive, the lower sample photo contains TOLAD at commercial concentration. Note the fine particle dispersion attained by TOLAD Fuel Additive.

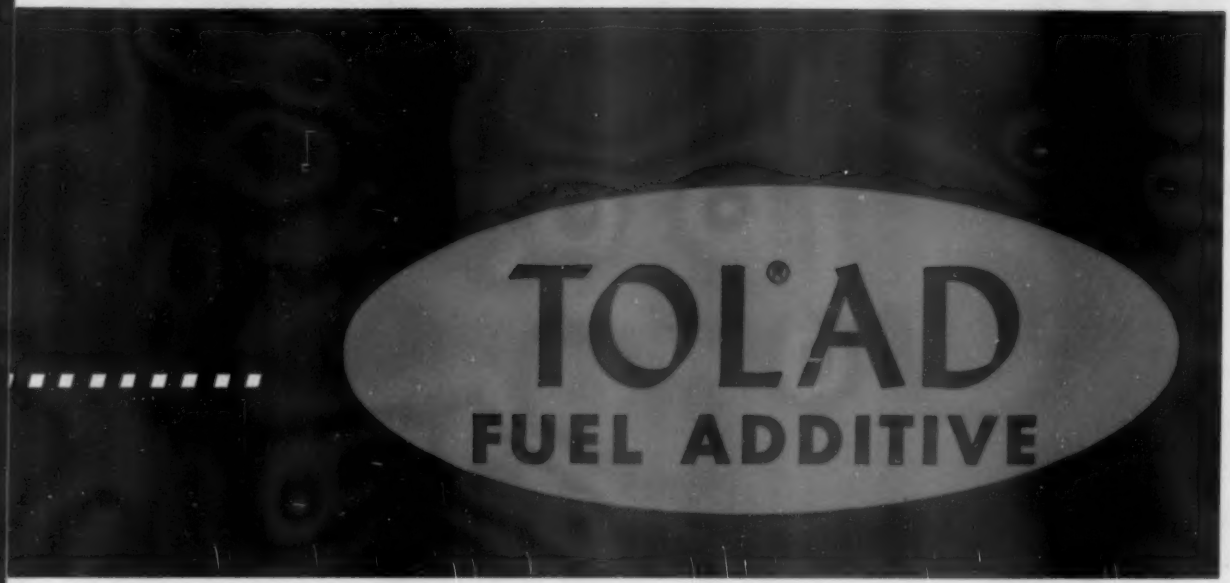
The use of TOLAD* Fuel Additive, by preventing deterioration of fuels in storage, enhances marketability and reduces customer complaints. TOLAD Fuel Additive prevents the formation of sludge and insoluble residue, the causes of fuel plugging in fuel lines, filters and burner tips. Insoluble residue also is a primary problem in diesel engine operation, causing fouling in fuel injection systems.

While TOLAD Fuel Additive is just being announced, it has been under laboratory test for over five years, and under controlled commercial testing for two years. As a result of these commercial use tests, six different refiners now use TOLAD on a routine basis. TOLAD Fuel Additive has been approved for use in diesel engine fuel by leading railroads.

One of the most important advantages of TOLAD Fuel Additive is its low cost. In two years of commercial use tests, TOLAD not only provided comparable *or improved* fuel stability for the fuels tested, but it consistently did so at a substantial cost advantage over the additive it replaced.

The graphs below illustrate the economic advantages of TOLAD over a well-known commercial additive. On fuel samples stored for 12 weeks at 110° F, the TOLAD-protected fuels showed less residue and better color, and always at a lower cost.





PA-60-1

added to domestic heating and diesel oils, TOLAD *improves their storage stability by . . .*

1. INHIBITING FORMATION OF INSOLUBLE RESIDUE

2. PREVENTING SLUDGE FORMATION

3. MAINTAINING COLOR STABILITY

TOLAD Fuel Additive is offered in a variety of formulations, all being ashless. TOLAD formulations are available, depending on the fuel oil characteristics, as inhibitors, inhibitor-dispersants, inhibitors with metal deactivator or inhibitor-dispersants with metal deactivator.

The Tretolite laboratories will test your fuel and recommend the TOLAD formulation most appropriate to insure stability improvement.

For complete information, ask any Tretolite refinery service engineer, or write to

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PETROLITE CORPORATION

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DIVISIONS
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ENGLAND: Petrolite Limited, 20 Savile Row, London W.1
GERMANY: Petrolite Anlagenbau und Vertriebsgesellschaft m.b.H., Frankfurt a. M.
VENEZUELA: South American Petrolite Corporation, Hotel Avila, Caracas

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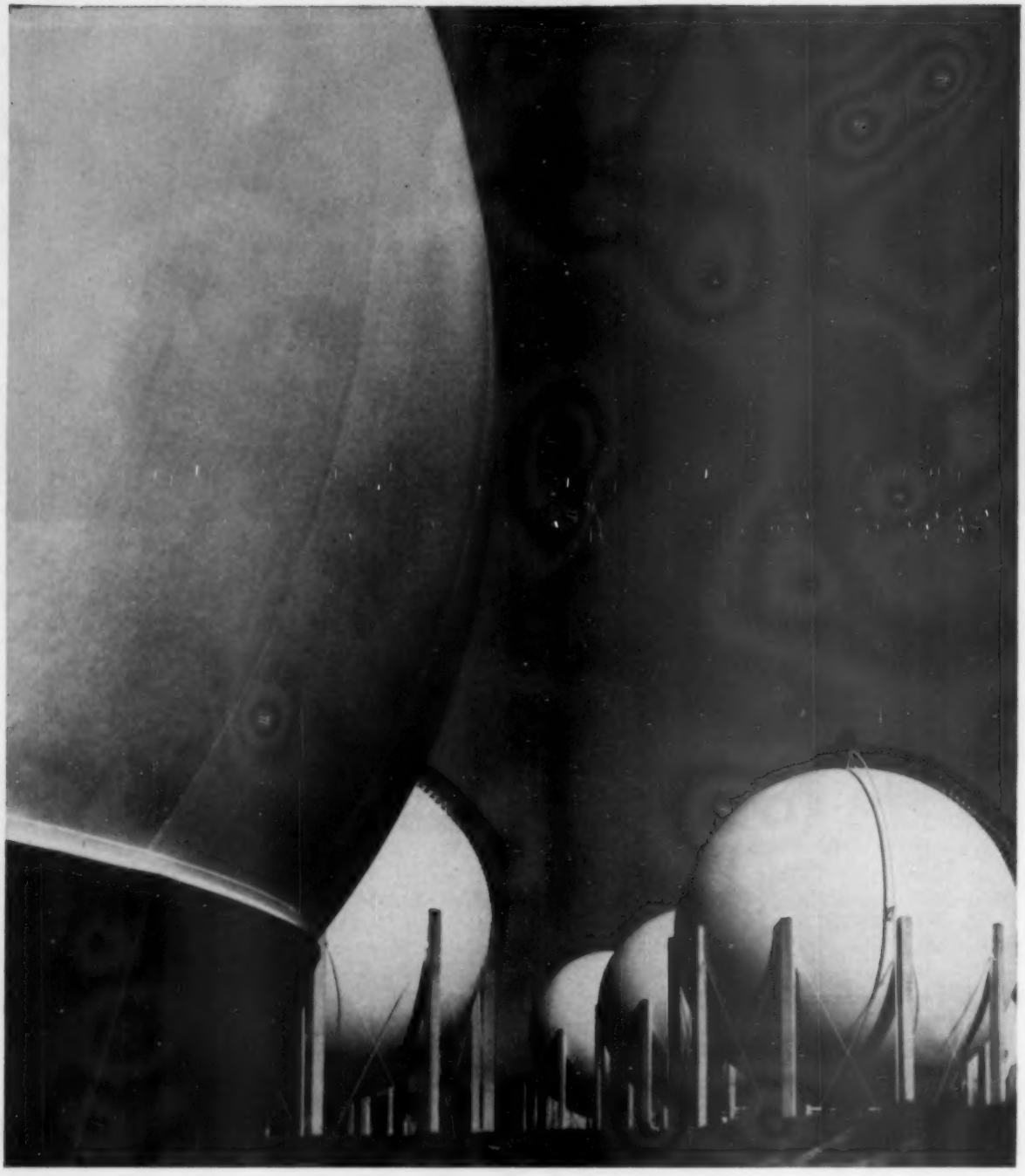
ITALY: NYMCO, S.p.A., 9 Lungotevere A. da Brescia, Rome
JAPAN: Maruwa Bussan KK, No. 3, 2-Chome, Kyobashi, Chuo-Ku, Tokyo
KUWAIT: F. N. Dahdah, Box 1713, Al Kuwait
MEXICO: R. E. Power, Sierra de Mijes No. 125, Mexico, D. F.
NETHERLANDS: F. E. C. Jenkins, Hoefbladlaan 134, The Hague
PERU: Oilfield Import, S. A., Apartado 71, Talara
TRINIDAD: Neal and Massy, Ltd., P. O. Box 544, Port of Spain



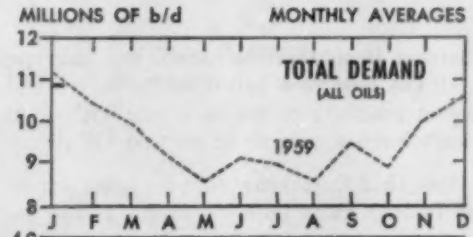
"It is true we have surplus capacity in all functions of the business. But it must be remembered that this surplus is measured against a daily consumption of immense proportions. Even the most conservative forecasts look for a continuing significant increase in demand throughout the world."

—Eugene Holman, Chairman of the Board

Standard Oil Company (New Jersey)

PETROLEUM WEEK'S

Fingertip Figures



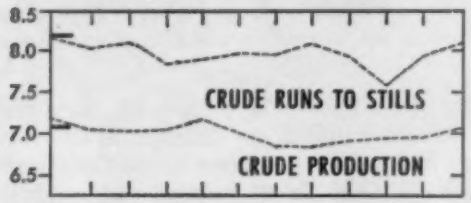
Figures for period ended February 12, except as noted

TOTAL DEMAND

Latest 4-week average	10.717
Year ago	10.915

DISTILLATE DEMAND

Latest 4-week average	3.149
Year ago	3.524

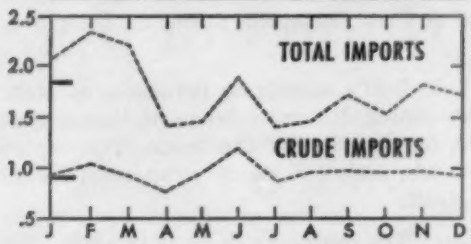


RUNS TO STILLS

Latest week	8.077
Previous week	8.199
Year ago	7.864

CRUDE PRODUCTION

Latest week	7.256
Previous week	7.293
Year ago	7.155

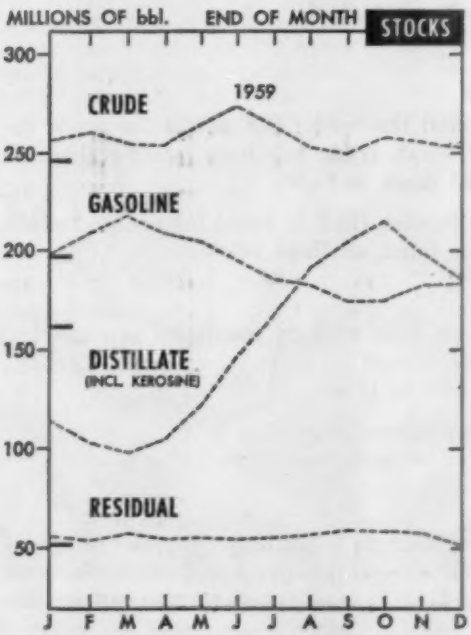


TOTAL IMPORTS

Latest week	1.615
Previous week	2.044
Year ago	1.849

CRUDE IMPORTS

Latest week	.814
Previous week	1.020
Year ago	.738



CRUDE STOCKS

Week-ended 2-6	250.0
Previous week	248.8
Year ago	257.2

GASOLINE

Latest week	208.9
Previous week	206.4
Year ago	200.1

DISTILLATES

Latest week	142.0
Previous week	145.8
Year ago	108.3

RESIDUAL

Latest week	48.0
Previous week	47.7
Year ago	55.6

The industry could be in "fair shape" by Apr. 1, if refiners ease up on their crude runs.

The Bureau of Mines forecasts that total crude runs to stills should not exceed 7.8-million b/d in March. That level would be 349,000 b/d below refinery runs for last March.

February runs will likely be much lower than the 8.3-million to 8.5-million b/d previously estimated, the bureau notes, because of the high level of stocks and the unseasonably mild weather.

The continued weak market prices for distillates should influence cutbacks in refinery runs. Otherwise, the oversupply situation will become much worse. Despite high product inventories last year, refiners did not cut runs to stills below the 8-million b/d "desired" level until May.

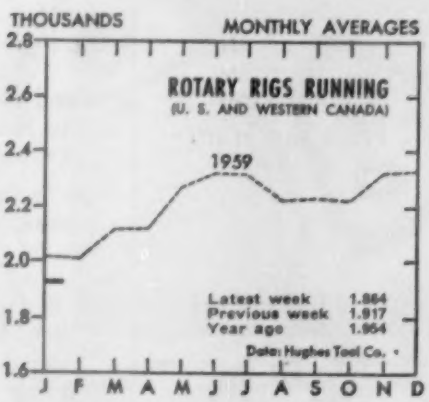
The Bureau of Mines forecasts that, if runs to stills are held at 7.8-million b/d in March, products stocks would come within range of "desirable" levels by Apr. 1.

Bureau forecasts indicate that with runs held in check, Apr. 1 distillate stocks should decline to 92-million bbl., down 7.4-million bbl. from a year ago. Gasoline stocks should drop 5.6-million bbl. to 213-million bbl.

Many company economists doubt that runs will be held that low—barring an unusual change in refiners' attitudes—and that demand will approach the level necessary to make up "lost" demand.

In the first 16 days of February, for example, the degree-day count was 82 less than normal. This is the equivalent of 240,000 b/d lost of heating oil demand.

One estimate is that weather in the remainder of February and all of March would have to average 6% colder than normal to chew up the distillate surplus.



The Market Trend

Price Shake-Up Coming in the Caribbean?

The guest-host relationship is under some strain this week in the Caribbean. The "guests" are the international oil companies. The "host" is the Venezuelan government.

The international refinery market is in terrible shape, but courtesy demands that the guest doesn't tell the host how bad it really is. Instead, refiners continue to quote Caribbean products prices on a par with U. S. Gulf prices, even though they don't have a prayer of getting them.

This week, actual netback prices that Caribbean refiners could expect seemed to be slipping farther and farther away from "posted." Motor and aviation gasoline prices conservatively could be discounted by 2¢ a gal., and probably by as much as 3¢ or 3.5¢. Distillates are about 1¢ away from the mark. Residual is soft by anywhere from 20¢ to 40¢ a bbl.

"Our prices in the Caribbean are political prices," says one U. S. refining executive. He deplored the increasing lack of realism in publicly listed cargo prices. At the same time, he acknowledged that a listing of hard, no-discount prices possibly could set in motion unfortunate tensions in Venezuela.

As long as Caribbean refinery prices follow the U. S. Gulf, there are bound to be severe strains. The demand patterns are different in the two areas. Distillate prices could range higher in the summer in the Caribbean than at the Gulf. On the other hand, Gulf Coast gasoline and residual prices probably would range higher than Caribbean prices on their own at all times.

Caribbean prices lack the U. S. Gulf's stabilizing influences of state crude allowables and U. S. import quotas. It's not infrequent that a Caribbean refiner will dump cargoes for the cost of the crude. The export nature of the Caribbean market, too, makes it much more sensitive to world conditions than the U. S. Gulf.

But what do you do as a guest? The courteous thing is to smile, and say the food is good and the beds comfortable.

Crude to Japan:

Selling is rough business all around the world. CIF prices for crude delivered to Japan show that Arabian crude has been landing there as low as $2.17 a bbl., and Kuwait down to $1.93.

At posted prices for crude in the Persian Gulf, it would take ocean freight rates of USMC—80% to reach Japan at these prices.

A Dispatch From the Front:

The box score on retail price wars this week is two down and two up. In Hammond, Ind., retail prices slipped 1¢ to 11.9¢, ex taxes. Los Angeles retail prices went to as low as 10.9¢.

On the upside, Kansas City prices jumped from 9.9¢ to 15.7¢. And many dealers in Indianapolis raised their price tags from 14.7¢ to 17.7¢.

U.S. Tankers:

U. S.-flag tanker rates again have fallen to levels below the cost of operation. The clean rate slipped to USMC—22½% for Gulf-New York, while the dirty rate is off to USMC—21¼%. Once again, surplus tankers are going back into lay-up.

RISING 30 FEET above the gasoline pumps, these canopies are made entirely of plastic. Monsanto has designed this service station . . .

Arch to Lure Highway Motorists

Oil marketers have a new station design to consider. It features a unique canopy constructed of reinforced plastic.

The arching canopy is intended to catch the speeding motorist's eye—especially from a distance.

As for the plastic, it reportedly reduces material costs and eliminates maintenance. It also makes the station light in weight, so no elaborate foundation is needed. Yet wind-tunnel tests show that 80-mph. winds can't knock it down.

The structure is the fruit of a combined effort by Wasco Chemical Co.'s Tru-Scale Division, Wichita, Kan., and Monsanto Chemical Co.

The first arch-type station to be built (in Baton Rouge, La.) actually represents a model for other oil companies to study.

Here's why: It was built for Lion Oil Co., a wholly owned subsidiary of Monsanto Chemical. Monsanto would like to interest other companies—particularly major oil marketers—in its arching design. To do this, Monsanto is using it's own oil company to put the station on display and also to test its appeal.

Monsanto believes that the trend of oil marketing today—especially on fast highways—will help sell its arching stations. Reason: Majors need inexpensive stations, says a spokesman, that are easy to maintain and, at the same time, attractive to motorists.

The 30-ft. arch is even more impressive at night. Concealed lights at the base of the arch make its translucent surfaces glow (picture, page 94).

The station has additional sig-

THE FIRST BEAM is lifted to its platform base and bolted to steel footing.

THE "SKIN," only .08 in. thick, is fitted between two beams and sawed to size.

RIVETS are used to secure the skin. Second canopy (in background) is optional.

nificance. It emphasizes Lion Oil Co.'s move into private-brand marketing.

Not content to sell gasoline under one label, Lion Oil last year created "Orbit," a private-brand flag. The new station design was built at an Orbit location.

J. H. Sheehan, director of marketing for the Lion Oil Division of Monsanto, told PETROLEUM WEEK last week that Lion had been watching the use of private-brand outlets by such majors as Esso, Humble, and Continental, and decided to follow suit. It seemed to be a profitable way to sell gasoline.

But Sheehan won't say how far Lion plans to expand the Orbit brand. Thus far there are seven Orbit outlets sprinkled between Beaumont, Tex., and Tampa, Fla. They're all salaried operations, which offer only gasoline, motor oil, and antifreeze.

As for the prototype station, there isn't enough information in yet to tell how successful it will be in drawing in motorists. It was opened in December.

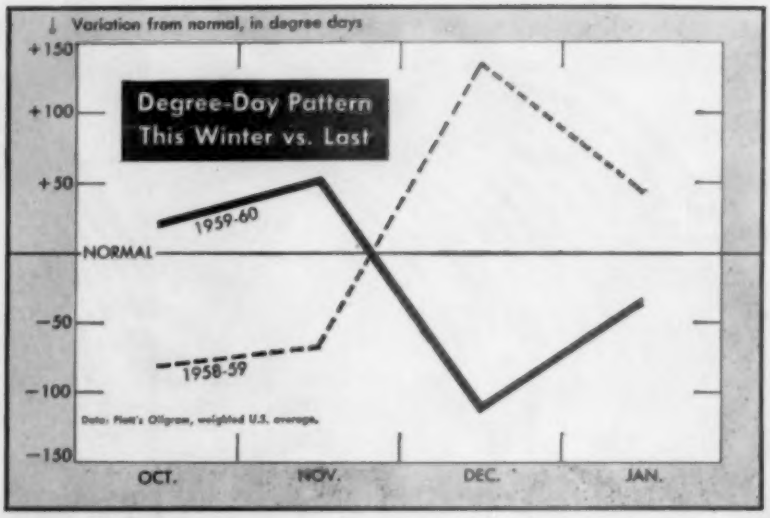
The design itself is flexible. The Orbit station features two canopies, but one is all that's needed to make an impression, Monsanto says.

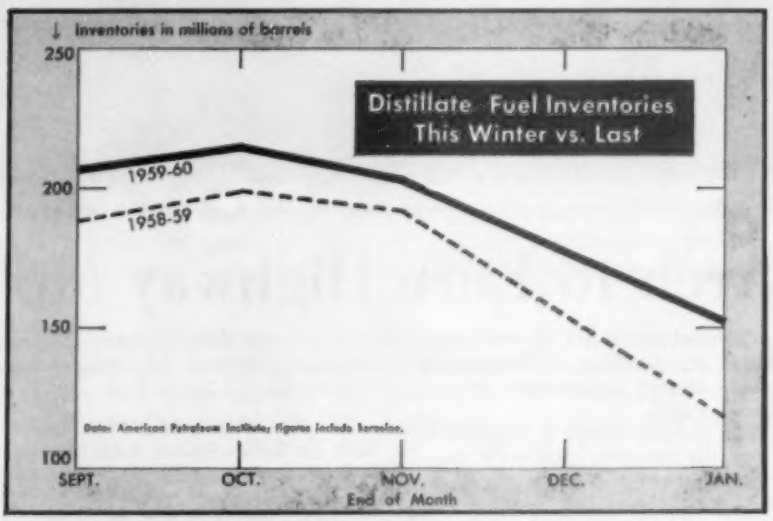
Furthermore, the canopy can be attached to existing station houses to add zest and significance to more prosaic designs. In this way, batteries and other accessories need not be left exposed in the open archway.

Price of the new stations is not yet available. But, Monsanto says, by using glass-reinforced polyester it was able to produce a permanent type of canopy of considerable size without exceeding a practical price range.

Sheehan notes, however, that the price and design of the stations would warrant their use only at high-volume locations.

CONCEALED LIGHTS at the base of the canopies makes their translucent surfaces glow at night.





A Mirror of Last Year—in Reverse

The weather this winter has been almost an exact reflection of last year—but the mirror images are sadly reversed (upper chart).

This year, the heating season started off with a colder-than-normal October and November. During the 1958-59 heating season, on the other hand, October and November came in with warmer-than-normal temperatures.

Then the whole thing turned topsy-turvy. During December and January, this year became warmer than normal, whereas last year's heating season boomed with the coldest December in 27 years and continued with a very chill January.

Latest degree-day figures indicate that the U.S. weighted average for this season compared to last Sept. 1 through Feb. 6 is down 7.1%.

(Each degree by which a day's average temperature falls below 65F represents one degree day.)

This ironic switch in the weather aggravated an already surplus supply position (lower chart).

The nation's fuel oil marketers had started this season with higher than desirable supplies of heating oils piling up at terminals and bulk plants. At the beginning of November this season, stocks of distillate and kerosine were 9% above last year, according to the Bureau of Mines, and 2% above "desirable" (PW—Nov.27'59, p11).

Ordinarily an early winter works to the advantage of distributors of heating oil. The market takes on a firmness that it rarely loses even if the weather warms later on.

But the cold came too soon. Its

early arrival encouraged refiners to increase their output of heating oils—by increasing runs and raising the percentage of distillates.

By the end of December, heating oil marketers were faced with the task of unloading 16% more oil than the year before, according to figures furnished by the American Petroleum Institute and the Bureau of Mines.

The cold weather through November had hardly put a dent into supplies. And then generally balmy temperatures came, and the demand for heating oil slumped with a thud that was heard all across the country.

Demand in December was 17% under the year before, according to API estimates.

Prices, instead of firming, became weak. At the start of this month, No. 2 heating oil at the Gulf dropped. And buyers are reportedly finding discounts of 0.5¢ per gal. below the new price—provided they are interested.

The spot cargo price of No. 2 at the Gulf declined 0.25¢ per gal. to 8.375¢ per gal. during the first week of this month (PW—Feb.9'60,p9). This compared to a strong 9.875¢ per gal. at the same time a year before.

Last week, few oil marketers were out looking for cargoes of heating oil, causing the current posted prices to remain weak.

In the East a rash of discounting has broken out as sellers seek buyers, while in the Midwest all grades of fuel oil except low-sulfur resid were being offered at discounts off posted prices.

It may be too late for colder weather from now on to "correct" the supply-demand imbalance of heating oils.

After an 11% drop in demand in January, compared to the previous year, the first-quarter picture will be approximately the same as last year, providing that the weather returns at least to normal.

The outlook for colder than normal weather for March and April is not good. It has happened in only three years out of the past 13.

API May Change its Oil Classification

The American Petroleum Institute may change its service classification for motor oil.

This classification describes the various driving conditions to which a motor oil can be subjected. It is, in effect, a technical language (acceptable to both the oil and auto industries) that describes the severity of these conditions. It was developed by API in cooperation with the American Society of Testing Materials.

The new wording of the classification may specify the years and models of automobiles that are covered by certain motor oils. Under present wording, this is only implied.

With more specific classifications, Detroit may be better able to gear its new models to existing oils, thereby avoiding the problem of supplying modified oil formulations to fit the new cars.

The impetus behind such a change in the classifications was brought on in part by a move made last fall by Ford Motor Co. In its 1960 car manuals, Ford worded its motor oil recommendations in such a way as to imply that the API service classification is actually a specification.

It was learned in Detroit that Ford has asked the oil industry for certain markings on oil cans to indicate that they contain oil suitable for new cars. But this would have amounted to grading (something oil men want to avoid), and the suggestion got a cold reception.

Some lube men feel that Ford is trying to overcome the drawbacks of its recommended long oil drain periods (4,000 mi.) by getting motorists to use a more durable oil.

The real reason for the change in the classification is the repeated failure of Detroit to inform the oil industry early enough about the oil requirements of its new models.

"Oil companies often get information on new models in May or June," says Howard P. Ferguson, wholesale and subsidiary sales manager at Standard Oil Co. (Ohio), and chairman of an API lubrication subcommittee assigned to find a meeting of minds with auto makers.

"If some motor oils on the market are not suitable for new models, there is hardly time to change formulations and to work down inventories before the new models appear in August or September." This means that better liaison between the auto makers and the oil industry is necessary.

The way oil companies learn about the requirements of next year's car engines is through the test sequences of ASTM.

This group is trying to find a series of test sequences that will give scientific, physical assurance that new car engines will be properly lubricated, says Ferguson.

"Maybe they will have to revise the sequences. We don't know yet," he comments.

A joint committee of the marketing and refining divisions of API will present suggestions for a practical coordination between the oil industry and the car marketers at a meeting in May. At that time the precise rewording of the API classification may be hammered out.

What's New / IN MARKETING

Rep. James Roosevelt (D., Calif.) has accused the American Petroleum Institute of not counting all the stations in its study of dealer turnover.

Roosevelt said last week that turnover runs to 39% a year—"the highest of any retail business, and TBA coercion by the majors is one of the contributing factors."

But API, which places lessee dealer turnover at 27%, says that its figure would be even lower if it counted other dealers stations that are leased by dealers, turn over much faster, it says, than stations that are owned by dealers or run by large distributors and major marketers.

Motivation research is being used by a public relations firm that is studying the consumer's reaction to conflicting oil-drain recommendations.

Jones, Brakely & Rockwell, in its $40,000 project for API's Oil Drain Practices Advisory Group, is undertaking an intensive review of the "mass of material' on oil drain recommendations, according to the company's account supervisor Henry T. Rockwell.

Part of the study involves motivation research, but the details cannot be announced at this time, Rockwell said.

JOHN GRANT moves up to plant manager of the PB Products section of Byron Jackson Tools, Inc., in Los Angeles. He was formerly chief engineer of that section, which specializes in the manufacture of oilfield rubber products. **L. E. Fuller,** who has been in PB Products' engineering department for the past 13 years, succeeds Grant as chief engineer.

T. W. Small

J. Grant

T. W. SMALL has been appointed manager of the West Texas district for Jones & Laughlin Supply Division, with offices in Odessa. He is moving from East Texas, where he has been a J&L salesman. Other newly assigned field salesmen and their locations are: **B. G. O'Brien,** formerly salesman at Greensburg, Ky., now salesman at the Harvey (La.) store; **M. D. Hartsell,** from salesman at Shreveport, La., to resident salesman at Jackson, Miss.; **R. R. Angerstein,** formerly salesman at the Ft. Worth office, now salesman at the Wichita (Kan.) sales office; **B. E. Irby,** formerly store manager at Longview, Tex., now salesman there; **J. M. Harp,** storeman general at the Shreveport store, now salesman there; **K. M. Snipes,** recent sales trainee at the Kermit (Tex.) store, now salesman there; and **D. Loyd,** sales trainee at Snyder, Tex., now salesman there.

JOHN JOSS has been appointed administrative assistant to **Leigh Taylor,** vice-president of marketing, for Southwestern Industrial Electronics Co., one of the Dresser Industries, with offices in Houston. He was most recently in SIE's advertising and publications department. Before joining SIE in 1957, Joss was associated with Schlumberger Well Surveying Corp., Houston.

BERTRAM J. MILLEVILLE moves up to vice-president of engineering and research for Ohio Injector Co., Wadsworth, Ohio. He was formerly director of engineering and research.

WILLIAM B. THOMAS has been appointed regional special sales representative for the Dallas-Ft. Worth area of Security Engineering Division, one of the Dresser Industries, with offices in Dallas. Thomas, who joined Security in 1951 as a salesman in Colorado City, Tex., served as district manager at Hobbs, N. M., and then as assistant division manager of the West Texas division, before his most recent promotion.

W. B. Thomas

J. L. Holmquist

JOHN L. HOLMQUIST is the new director of research, tubular products, for National Supply Co., with offices in Pittsburgh. He will be responsible for research and development, both on seamless tubular products, manufactured at the company's Ambridge (Pa.) plant, and on welded tubular products, manufactured at its Etna (Pa.) plant. At the same time, **Thomas L. Blose** was appointed director of product engineering at Ambridge, succeeding Holmquist, and **Lawrence W. Peugeot,** assistant chief engineer at Ambridge, succeeding Blose. Peugeot was named superintendent of plant maintenance at the Toledo (Ohio) plant in 1958, and was transferred to Ambridge when the Toledo plant closed last September.

1960 OFFICERS of the Pipeline Contractors Assn. elected at its recent annual meeting in Los Angeles are: **Jack Gray,** Austin, Tex., president; **Robert D. Sheenan,** Tulsa, first vice-president; **J. W. Sharman,** Houston, second vice-president; and **E. G. Morrison,** Austin, treasurer.

E. F. WENTWORTH, JR., and F. M. PYZEL have been named vice-presidents of Foster Wheeler Corp., New York. Wentworth, who joined the company in 1941, has been general attorney in charge of the legal department since 1950. Pyzel joined Foster Wheeler in 1944 as director of process development in the engineering and research department, and in 1959, he became director of the process development department, with responsibility for new development activities in all the process industries. He was technical advisor for Shell Development Co., San Francisco, before joining Foster Wheeler.

A. L. (Al) SIMPSON is the new North area sales representative in the Pacific division of McCullough Tool Co. The North area is a newly created sales territory, which includes the Bakersfield, Avenal, and Rio Vista districts. Simpson, who joined McCullough Tool in 1950, was most recently assistant sales manager of the Bakersfield district.

A. L. Simpson

H. Siegley

HARRY SIEGLEY is the new district sales manager in Dallas for the Baash-Ross Division of Joy Mfg. Co. Siegley, who will handle domestic sales in the Dallas-Ft. Worth area and as far north as Wichita Falls, will also be responsible for some export sales. He was formerly district sales manager for Baash-Ross in Wichita Falls.

R. H. RAINEY, Far East operations manager, in Singapore, for Geophysical Service Inc., moves to Dallas as marketing manager. He succeeds **J. W. Thomas,** a vice-president, who is to retire later this year. At the same time, **John McCormack** was named assistant vice-president to coordinate personnel, equipment, and industrial engineering department activities, with offices in Dallas. He will continue as GSI controller.

SIDNEY SELINGER and **JEAN F. BROWN** are new assistant vice-presidents of Sooner Pipe & Supply Corp., Tulsa. Selinger has been with

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the company since 1951, serving as traffic manager and head of the tubular goods department. In his new position, he will continue to supervise both of these departments. Brown has been with the company for the past 15 years. **Bill Webster** has joined the company as city salesman in Tulsa.

JOHN W. BORROR moves up to assistant sales manager for Herb J. Hawthorne, Inc., Houston. He joined the company last year as a field sales engineer. Before that, he was an engineer for Sohio Petroleum Co. and Gulf Oil Corp., in the Mid-Continent and Gulf Coast areas.

J. W. Borror

D. Jensen

DONALD JENSEN is the new advertising and public relations manager for ACF Industries, Inc., New York. He will supervise corporate public relations and advertising operations, and coordinate similar activities for the company's six operating divisions. Since 1954, he has been responsible for financial, employee, and plant communications, and advertising, for Square D Electric Co., Detroit.

R. M. BOONE has transferred to Cooper-Bessemer Corp.'s Odessa (Tex.) branch office, and **RICHARD H. VAN BERGEN** to the New York branch office, as sales engineers. Both were formerly assigned to the sales department at the company's headquarters in Mt. Vernon, Ohio. Boone will work under the direction of **C. L. McDougall**, Odessa branch manager, and Van Bergen under **C. J. Havekotte**, New York branch manager, on the application and sale of Cooper-Bessemer compressors and engines. **William R. Bohannan** becomes a sales engineer in Venezuela for Cooper-Bessemer International, with offices in Caracas. He will work under **Frank G. Bawden**, district manager, and will be concerned with the sale of engine-driven and motor-driven compressors to South American markets. He also was formerly with Cooper-Bessemer in Mt. Vernon.

M. H. FESLER becomes western industrial sales representative for Kobe, Inc., with headquarters at the company's main plant at Huntington Park, Calif. He will be responsible for western sales and service of Kobe pressure triplex plunger pumps in the industrial, aircraft, and missile fields.

BILLY GRAHAM becomes area manager at the new Odessa (Tex.) office of Servco, Long Beach (Calif.) drilling tool manufacturer. **Art Long** transfers from Long Beach to Servco's Houston office as sales engineer, and **Ray Baker** has joined the Houston office as a sales engineer.

JOHN T. KNIGHT has been named district manager for West Texas, in charge of Norvell-Wilder Supply Co.'s Midland sales office. He has been sales office manager for the Company at Tulsa for the past several years.

ALBERT N. CRAWFORD has been appointed sales manager of the industrial tank division of Cutler Metal Products Co., Camden, N.J. He was formerly manager of the tank division of John Wood Co.

L. L. Warriner

G. C. Woodard

H. C. Johnson

L. L. WARRINER has been elected chairman, **GRANT C. WOODARD** vice-president of marketing, and **HAROLD C. JOHNSON** vice-president of manufacturing, for Cooper-Bessemer Corp., Mt. Vernon, Ohio. Warriner, who has been a Cooper-Bessemer director for the past 15 years, succeeds **L. F. Williams**, who is retiring after 40 years with the company. Warriner, who retired from the presidency of Master Electric Co., in 1956, is currently a management and engineering consultant. Woodard, new marketing vice-president, joined the company in 1948, and has been general sales manager since 1957. Johnson, the new manufacturing vice-president, joined the company in 1946; he was most recently manager of manufacturing for Cooper-Bessemer's plants located at Mt. Vernon, and at Grove City, Pa.

SURE...I had a heart attack'

Jack Morgan, oil worker, is one of thousands back at work after a heart attack.

New drugs, new treatment, the latest knowledge developed through heart research helped pull them through.

You don't have to have heart disease to appreciate the story of Jack Morgan and the value of research supported by the Heart Fund. Whatever your job, your life depends on your heart. Whatever protects your heart is a sound investment in your future.

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GIVE

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DEPT/Personals

M. Nixon

F. P. Peterson

MASTON NIXON has been elected chairman, and **FRANK P. PETERSON** president and a director, of Southern Minerals Corp. and its subsidiary, Southern Pipe Line Corp., both in Corpus Christi. Nixon, who has been president of the two companies, continues as their chief executive officer. Peterson has been executive vice-president of both companies since 1957.

ED PARKES, president and director of United Gas Corp., Shreveport, has been elected a director of the First National Bank of Shreveport. Parkes, who has been associated with United Gas for 32 years, is also president and a director of its subsidiaries, United Gas Pipeline Co. and Union Producing Co.

THREE NEW MANAGERIAL APPOINTMENTS have been made by Iranian Oil Operating Companies, two operating companies of the International Consortium. **R. Ghavami** has been appointed assistant general refinery manager of Iranian Oil Refining Co. He also replaces **S. K. Kazerooni** on the Iranian Oil Refining board. **M. Khosrovi** has been appointed assistant general fields manager for Iranian Exploration & Producing Co. Khosrovi, formerly assistant head of the operations division, has been a director of that company since 1956. **M. A. Javid** is the new head of the personnel division for the refining company. He has been head of industrial relations and field superintendent for the producing company. At the same time, **M. Farmanfarmaian,** who was recently appointed to the National Iranian Oil Co. board, has been named director of the NIOC's distribution organization.

EDWARD A. ALBARES is the new director of conservation for the Arkansas Oil & Gas Commission. Albares, formerly assistant to the chief engineer of the Louisiana Department of Conservation, succeeds the late **George Holden.** Albares is a member of the regulatory practices committee of the Interstate Oil Compact Commission, and has headed Louisiana Department of Conservation committees responsible for well spacing and commingling of production between wells.

JOHN R. HODSON and **ERHART K. DRECHSEL** are new associate directors of Texas Butadiene & Chemical Corp.'s development department, with offices in New York. Hodson spent the last three years with TB&C in process economics and in the development department. Drechsel comes to TB&C from Escambia Chemical Corp., where he was manager of new product development. At the same time, **Ernest W. Kirchheimer** was appointed senior process economist in the development department. He transfers to New York from Channelview, Tex., where he was a process engineer at the TB&C plant there.

A. M. WIEDERKEHR is the new vice-president of exploration for Southern Union Gas Co., Dallas. He will be in charge of the company's land, geological, drilling, and production departments. Wiederkehr joined Southern Union in 1952 as a reservoir engineer, and in 1954 was named head of the exploration department.

A. M. Wiederkehr

D. L. Campbell

DAVID L. CAMPBELL, senior vice-president since 1957 of British American Oil Co., Ltd., Toronto, moves up to executive vice-president. Campbell, who joined B-A in 1934, became vice-president of manufacturing in 1954, and was elected a director in 1956. **Clarence D. Shepard,** Q. C., B-A's general counsel, has been given additional responsibilities as vice-president and a director.

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Before he joined B-A as general counsel last year, Shepard was chief commissioner of the Board of Transport Commissioners and acting chairman of the Air Transport Board, in Ottawa.

F. A. Upson

L. H. Huth

LOUIS H. HUTH has been appointed to the newly created position of manager of operations, and **FRANK ALLEN UPSON** to the newly created position of manager of engineering, for Amoco Chemicals Corp., Chicago, subsidiary of Standard Oil Co. (Ind.). Huth will be in charge of Amoco's plants in Joliet, Ill., Texas City, Tex., and Seymour, Ind., and Upson will be responsible for engineering and construction of new plant facilities and other projects. Huth has been superintendent of operations at Standard's Mandan (N.D.) refinery since 1954, and Upson was most recently chief engineer in the process engineering division at Standard's Whiting (Ind.) refinery.

BILL B. MURRAY has joined Wilshire Oil Co. of California as manager of operations, at Los Angeles. Murray will be responsible for the supervision of transportation, the operation and maintenance of terminals, engineering, planning, and construction of the company's marketing facilities. Murray has had ten years, experience in oil marketing engineering.

O. C. JOHNSON, formerly regional manufacturing manager of Mobil Oil Co., has been named manager of manufacturing operations. Johnson, with the company since 1934, became manager of the East St. Louis (Ill.) refinery in 1952. He moved to the New York headquarters as central region manager in 1956, and became regional manager last year. **Stephen P. Cauley,** formerly assistant manager of the fuel oil division in Mobil's gasoline and fuel oil department, has been appointed commercial pricing manager. Cauley joined the company's East Chicago refinery in 1936. He became supervisor of the product engineering division of the technical service department in 1943, and was appointed to his most recent position in 1948.

C. HAYDEN ATCHISON has been promoted to exploration coordinator of British-American Oil Producing Co., with offices in Dallas. In his new position, he assumes the responsibilities of the former chief exploration geologist, **R. C. Marmaduke,** who resigned. Atchison will also be responsible for coordinating the company's exploration program throughout the United States. Atchison, who has been with B-A since 1951, was most recently division manager of exploration for the Southwestern division, at Midland, Tex.

HOWARD J. GRADY is the new president and director of California Spray-Chemical Corp., subsidiary of Standard Oil Co. of California, in Richmond, Calif. He succeeds **A. W. Mohr,** who recently retired. Grady, with Calspray since 1926, was named regional manager of marketing on the East Coast in 1948, with offices in Washington, D. C. Ten years later, he was named to his most recent position of executive vice-president, at Calspray headquarters in Richmond. Grady has also been named president of Ortho Agricultural Chemicals, Ltd., of Canada.

ROBERT R. GARRISON has joined Lion Oil Co., division of Monsanto Chemical Co., in the new position of director of refinery sales, with offices in El Dorado, Ark. He has been assistant sales manager for Suntide Refining Co., in Corpus Christi, for the past six years. In his new position, Garrison will direct the sales of all Lion's refinery products in bulk with the exception of those marketed through the branded sales section and the independent station sales section.

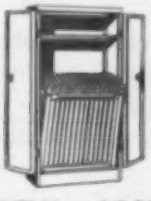
R. R. Garrison

D. F. Clugston

D. F. CLUGSTON is the new division sales manager of Vickers Petroleum Co.'s new Nebraska-Iowa sales division, at Omaha. For the past four years, Clugston has been sales manager of the Omaha marketing division of Champlin Oil & Refining Co. **Richard S. Westin** and **Edward W. Bevans** are new sales representatives for Vickers' new sales division. Westin was formerly an oil company representative and a district sales supervisor, and Bevans has been district sales supervisor and lube representative for Champlin since 1955.

BILL RODEN, Midland independent, is president of the new Mesquite Gas Products, Inc., Midland, a new West Texas company organized for building, owning, and operating small gasoline plants in the Permian Basin. **A. L. Hickerson** of Odessa is vice-president and general manager of the new company. He is president and co-owner of Foreman Brine Sales & Service, Inc., and its subsidiaries. Hickerson will continue as president of the Foreman companies, but will devote most of his time to the management of Mesquite Gas Products. **Joe Ardis,** formerly Midland representative of Foreman Brine Sales & Service, will be superintendent of the Davis gasoline plant, Mesquite's first plant in Upton County, now under construction.

JACK D. SULLIVAN has been appointed manager of Texas Gas Transmission Corp.'s income tax department, with offices at the company's headquarters in Owensboro, Ky. Before joining Texas Gas, Sullivan was comptroller for Boring & Tunneling Co. of America, Inc., Houston. He has also served with Transcontinental Gas Pipe Line Corp. and Trunkline Gas Co.

MAP  FILE

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Acquittal: The Only Verdict Possible

THE WANTON WASTE of the oil industry's and taxpayers' money by the Justice Dept., in an attempt to prove a "price conspiracy" has resulted in the only decision that could be reached from hearsay evidence—acquittal.

Perhaps one of the best summations came from Simon Rifkind, the attorney for Cities Service and a former federal judge. Shortly after Federal Judge Royce H. Savage reached his decision late last Saturday at Tulsa, Rifkind commented: "The case has served one useful purpose. It's to have the public know that the oil industry didn't conspire."

THE PROOF WAS COSTLY and time-consuming, though. The 29 companies charged with conspiring to raise crude and gasoline prices spent millions of dollars in preparing their defense. And the government spent a considerable amount of tax dollars in subpoenaing more than 8,000 documents from the defendants, even though it introduced only about 600 of them at the trial.

The grand jury from which the government obtained its indictment at Alexandria, Va., sat 18 months. Following the indictment, another 21 months were devoted to preparing a case by the government—and a defense by the oil companies. The government's pretrial brief ran 501 pages, and its bill of particulars filled another 291 pages. And the oil companies marshalled a force of 80 attorneys to present their side of the case.

The trial itself was condensed into a little more than seven days of prosecution testimony plus two days of arguments. Then Judge Savage, who said there was no necessity to delay an opinion, ruled: *"It is my judgment that the evidence in the case doesn't rise above the level of suspicion."*

The decision in the case confirms—not unexpectedly—two important axioms of the American free-enterprise system:

- The profit motive is a justifiable reason to do business. *"These defendants were interested, I am sure, in increasing the price of oil as there might be economic justification for it. They were interested in increasing profits. I don't know of any business corporations that are not, and understandably so."*
- Parent companies are expected to have close ties with their subsidiaries. *"It is my view that the mere approval by a parent corporation of the price schedules and price policies inaugurated and fixed by a subsidiary corporation does not constitute a per se violation of the Sherman Act."*

OIL WAS VINDICATED in court. And the public can justifiably question the government's unwarranted expenditure of tax money just to satisfy the whims of a few ambitious Justice Dept. lawyers.

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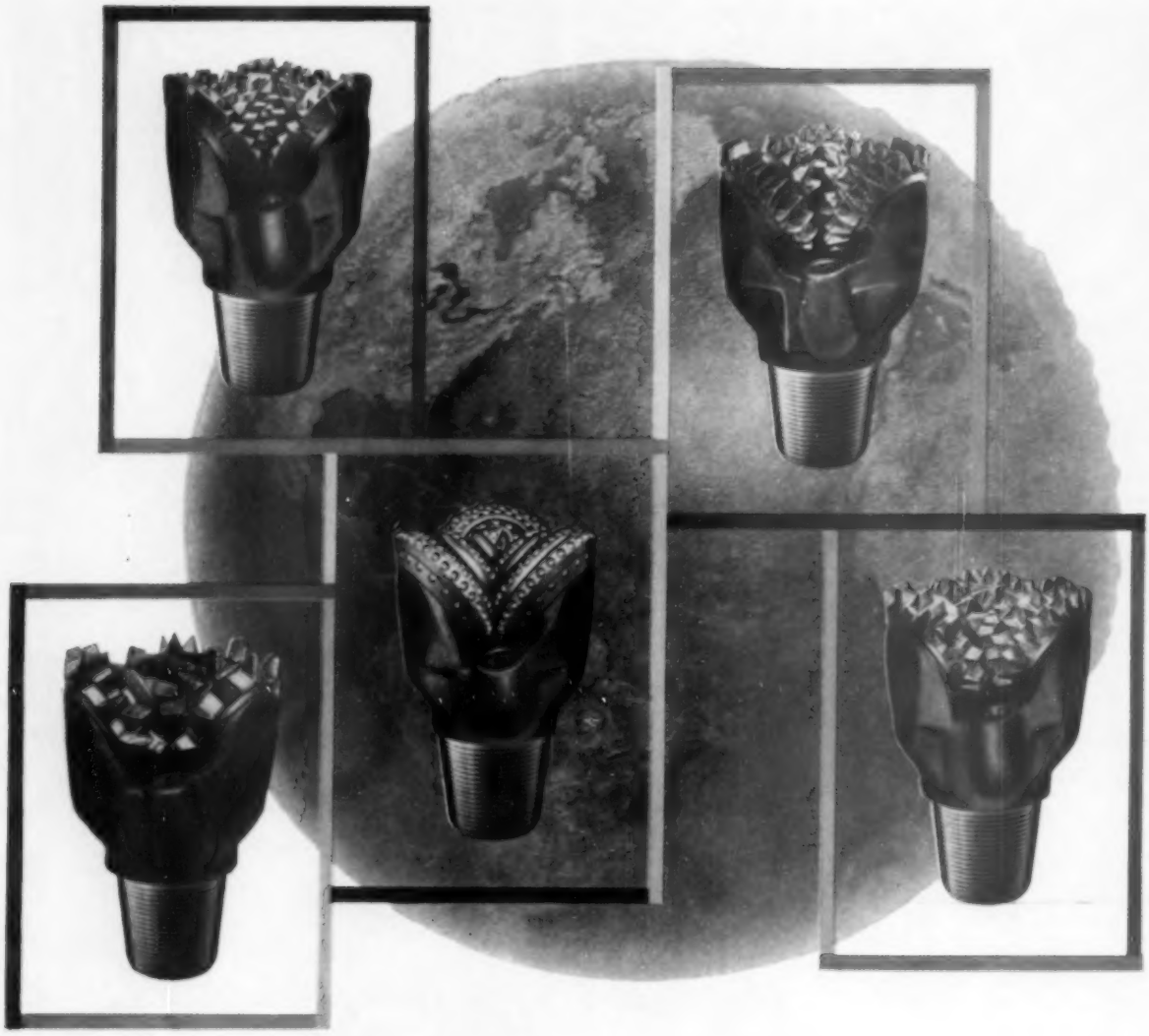

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